Henson 8000 User Guide

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Henson 8000 User Guide

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Printed: February 2014

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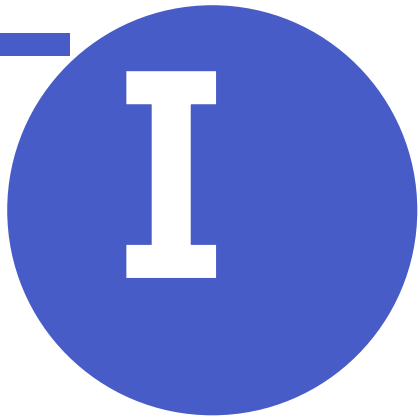
Part



1 Welcome

This guide explains how to use the .

The allows you to carry out routine visual field examinations on your patients. We have designed the unit with simplicity of operation and ease use in mind; you will quickly be able to obtain valuable and accurate visual field data.

This guide contains the following information:

- Installation 32
- Quick Start 36
- Supra-threshold tests 47
- ZATA tests
- Estermann Drivers Test
- Database program 89
- Utilities program 100
- Options program 108

To find out more about the Henson range of perimeters, the latest upgrades etc. visit http://www.elektron-healthcare.com

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1.1 Introduction

The Henson unit must be used in accordance with the operating instructions.

Please read the instructions before attempting operation.

The instructions in this manual are to be viewed as an accompaniment to correct training on this equipment.

The results of a test are only to be analysed by a suitable qualified person, and it is the responsibility of the practice manager/owner to ensure that only suitably trained personnel are operating this equipment.

Contact your sales agent for details of on-site training.

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1.1.1 Elektron Company notices

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1.1.1.1 Revision History

Release	Date	Change
	30/08/13	New version for V2.0 software
Version 1.0	Feb 2014	first version for for 9

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1.1.1.2 Important warnings

WARNING

This unit must be connected to an earthed mains supply

WARNING

Hazardous voltages are present inside the electrical enclosures of this unit. No user-serviceable parts inside

WARNING

This equipment is not suitable for use in an oxygen rich environment

WARNING

This equipment should be kept dry at all times

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1.1.1.3 Explanation of symbols used in manual and on instrument

Definition of symbols used in the manual and on the instrument.

WARNING

Consult manual

WEEE Directive

0

Power Off (0)

1

Power On (1)

Type B Applied Part

Hazardous voltage

CE mark

USB

Protective earth

~

AC Mains

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1.1.1.4 Database warning

The Henson software stores visual field data in a database the location of which is defined in the Options file.

The default location is your computers hard drive (c:\HensonX000\data \fld8.MB).

The backup location in the options program should be set to another drive on your computer / network. This can be a removable USB drive or, if networked, a shared drive on another computer / server.

Every time you save or edit a visual field record both the default database and the backup database are updated.

An additional copy of the database should be made periodically and stored in a safe location away from the perimeter. This can be done through the Utilities program

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1.1.1.5 Acknowledgements

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Elektron Technology UK Ltd. continuously improves the design processes of its equipment to minimize the negative impact on the environment and the communities in which the equipment is manufactured, shipped, and used.

This symbol on the product or on its packaging indicates that to preserve the environment, this product must be recycled after its useful life as required by law and must not be disposed of with your household waste. It is your responsibility to dispose of your waste electrical and electronic equipment by handing it over to a designated collection point for the proper recycling of such equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about the authorized collection location nearest to you, please contact your local city office, your household waste disposal service or the agent from whom you purchased the product.

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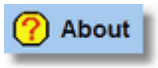
1.2 About the Henson Perimeter

The is a compact perimeter which is made in the UK by Elektron Technology UK Ltd:

http://www.elektron-healthcare.com

- The device uses LEDs as stimuli, and is capable of testing the visual field out to an eccentricity of 30 degrees. (To 72 degrees for binocular test with fixation move)
- The background luminance is maintained at 10 cd/m^2
- The perimeter is controlled from an external computer running in the Microsoft Windows environment. You can check the software version number of your machine by pressing the **About** button on the start-up screen.



- The LEDs have an angular subtence 0.5 degrees (Goldmann size III) and their maximum intensity is 10,000asb. (0dB)
- The LED presentation time is 200ms in all tests.
- When starting a new test, the software checks that the hardware is working properly and that the background luminance is correct. If incorrect a message will appear on the screen.

If you have any problems with your perimeter, contact the agent who supplied the .

Bowl Luminance

- The bowl luminance is maintained at 10 cd/m^2
- At the beginning of each examination the bowl luminance is checked by the computer's software. If it is out of tolerance a background error[129] message will be displayed on the screen.
- The Henson Perimeter automatically compensates for changes due to shifts in the room illumination (within limits)

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1.3 Available tests

The following threshold programs are available with the :

- **Multiple Stimulus Supra-Threshold**: Choose this if speed is important. It is approximately twice as fast as the Single Stimulus supra-threshold strategy in patients with little or no defect. This is a manually operated test
- **Single Stimulus Supra-Threshold**: Choose this test to screen large numbers of patients. This is a fully automated test where the patient presses a response button[29] every time they see a stimulus.
- **ZATA** (Zippy Adaptive Threshold Algorithm): This is the latest threshold strategy to be incorporated in the Henson perimeters. It is faster and more accurate than the Full and Fast Threshold programs and will normally be program of choice. The ZATA program uses a Baysian algorithm and adaptive terminating criteria to make the best use of prior data and all test findings.
- **Drivers**: The Drivers Test program is designed to see whether or not a patient meets the visual field requirements for driving.

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1.4 Useful information

Some of the screen shots in this manual may be from different versions of the software; they may differ slightly from the software installed on your machine.

Software upgrades

Upgrades of the software and documentation are available to download from the support section of the Elektron healthcare web site:

http://www.elektron-healthcare.com

If you do upgrade the software, you will find up-to-date operational instructions in the online help, which you can access by pressing the Help button on the toolbar on any screen in the Henson software.

Keep all the supplied literature and software in a safe place.

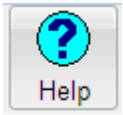
Important: Back up the database regularly

We strongly recommend that you back up the database of patient records on a USB memory stick or other suitable removable media, to avoid any possibility of data loss.

This simple procedure is described later in this manual in Database Backup 97.

Context-sensitive Help

The **Help** button is one of the most important buttons on the toolbar 84. It is available on every screen and dialog: press it to display context-sensitive help.



Software version

To determine the version of your installed software, you can press the ABOUT button on the main menu program.

Selecting this button open up a window that tells you the version number of your current software, see below.

In addition it gives you a link to the web site of Elektron- the manufacturers of the Henson range of perimeters and a second link to a file that gives details of your License.

To close this window select the OK button.

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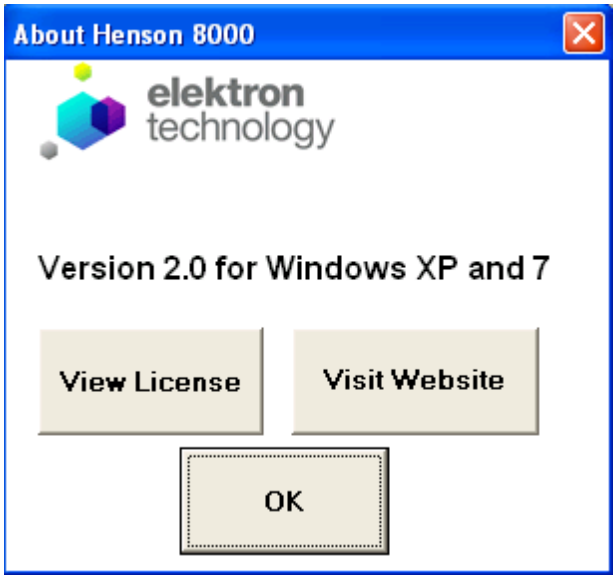

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1.5 Using different input devices

Throughout this guide there are references to **selecting** items and **pressing** on-screen buttons. The method you use depends on which type of input device you are using:

Touchscreen

- Touch the screen with your finger and drag the on-screen pointer around. This is just like dragging the mouse pointer around on a standard computer screen.
- Tap an item once on the screen to **select** it, or to **press** an on-screen button (there is no need to 'double-click' as you do in Windows, for example).

Mouse

- If you are using a mouse, move the pointer over an on-screen item and left-click to **select** it, or to **press** an on-screen button.

Laptop trackpad

- Touch the pad with your finger and drag the on-screen pointer around. This is just like dragging the mouse pointer around on a standard computer screen.
- Tap an item once on the pad (or use the left hand button below the pad) to **select** it, or to **press** an on-screen button (there is no need to 'double-click' as you do in Windows, for example).

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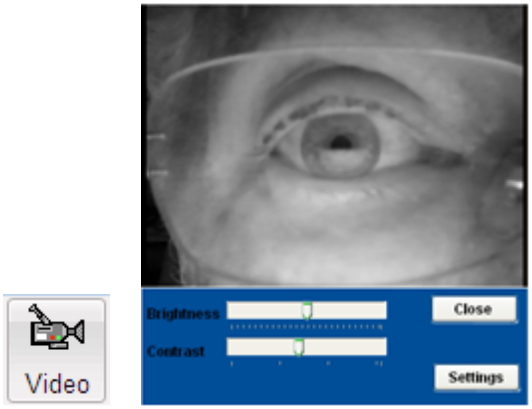
1.6 Video Camera

The

Henson 9000

is fitted with a video camera for monitoring a patient's fixation. The video camera's output is displayed in a window on the computer screen during tests.



To adjust the brightness and contrast

1. Press the **Video** button.
2. Adjust the brightness and contrast using the sliders.
3. Press the **Video** button again to close dismiss the controls.

The settings will be stored at the end of the test and used in future tests.

To set up a video camera

Use the Video Setup[115] tab in the Options[108].

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1.7 Response button

The Patient Response Button (PRB) is used by the patient in the single stimulus tests.

- Single stimulus 51 supra-threshold
- ZATA threshold test
- Drivers Estermann test

At the beginning of a test the patient is given the Response button to hold in their hand and instructed to press and release it each time they see a stimulus.

When pressed and held down, the Response button will suspend further stimulus presentations until released. This is useful if the patient needs to lean back from the unit temporarily.

During a test, the **Px Resp** button in the toolbar gives a visual indication of when a patient presses the Response button.

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1.8 Refractive correction

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Part

2 Installation

Important!!

Install the software **before** plugging the USB lead between the Henson 9000 and the laptop/computer.

To install the software:

1. Insert the supplied USB flash drive into the laptop/computer and wait for the prompt.
2. Select **Open folder to view files**.
3. Open the folder called *Software* and double-click on the software EXE file.
4. Follow the on-screen instructions to install the software.
5. Once the software is installed, connect the USB cable between the Henson 9000 and the laptop/computer.
6. Open the Henson 9000 *Options* program by double-clicking the icon on the computer's desktop.

7. Display the *Computer* tab and check that there is a Device listed in the list box on the page.
8. Display the *Address* tab and fill in the practice address details.
9. Click **Save**.
10. Open the Henson software by double clicking the Henson 9000 icon on the desktop. (in future if you wish the software to start up when the computer is started you can add this shortcut to the STARTUP folder)
11. You will see the main Menu screen showing the available tests.

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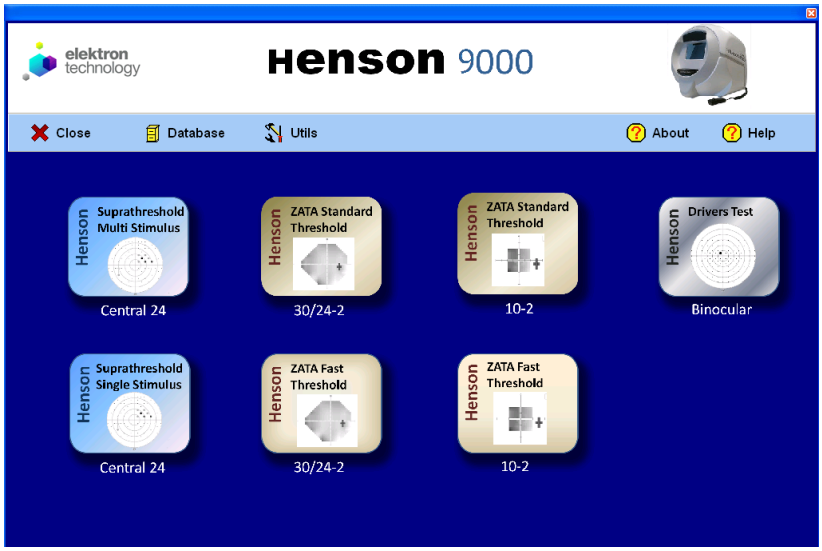

The software is now successfully installed.

Note: To save records and use the database you will need to have the free Adobe™ Reader installed.

This can be obtained from the website www.adobe.com

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Part

3 Quick Start

SCREENING TEST

Here are the main steps you follow to perform a quick screening test:

1. Apply refractive correction[30] .
2. Choose a test[37].
3. Enter the patient's date of birth[38] .
4. Read out the Patient Instructions[39].

Run the test:

- Run Single Stimulus Test[48]
- Run Multiple Stimulus Test[66]

6. Analysis of resuts

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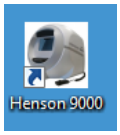
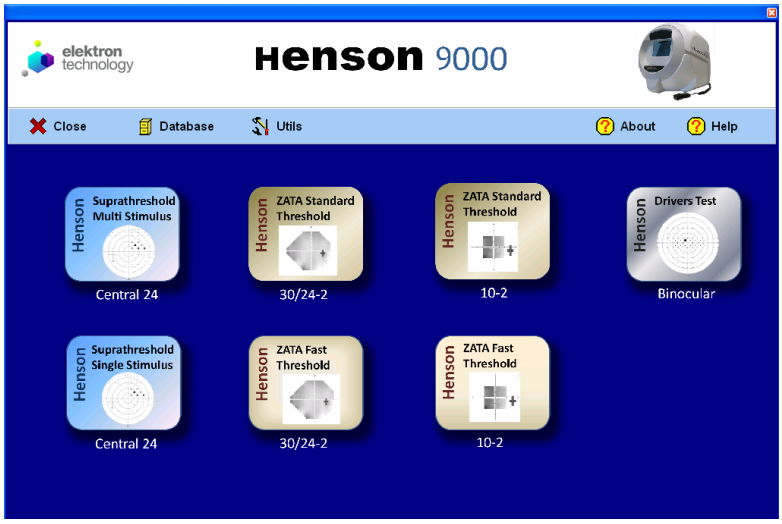
3.1 Choose a test

To select a test:

1. Double-click the desktop icon to start the test software.



2. Click the appropriate test button on the start-up screen.



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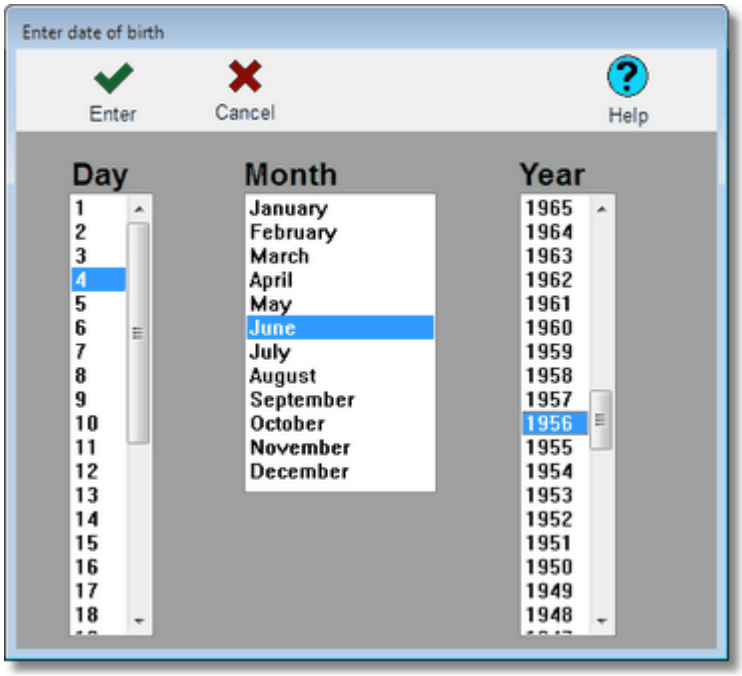
3.2 Enter the date of birth

At the start of nearly all of the tests, you need to enter the patient's date of birth.

- By default, the patient's age is used to establish the starting test level for the Suprathreshold tests. (You can change the method used to determine the threshold in the Options program 110.)
- The age is also automatically added to the database record, and to any printouts.

To enter the date of birth:

1. Select the Day, Month and Year from the lists.
2. Press the **Enter** button.



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3.3 Read out the Patient Instructions

The patient instructions for stimulus tests vary according to whether or not the test intensity[54] is set by the *age* of the patient or by *measurement*.

Supra-threshold: Single stimulus

Threshold set by age

- The test is going to take about 2 minutes. Make sure you are comfortable.
- Press your response button when you see a light flash.
- You will not see a light every time; some presentations are deliberately blank.
- Do not guess. If you are not sure that you saw a light, do not press the button.
- Keep looking at the central red light.
- Keep your eye as still as possible.
- If you want to take a break, hold down the response button. The test will pause until you release it.
- The first few presentations are a demonstration, so do not worry if you make a mistake.

Add when setting the threshold by measurement

- At the beginning of the test the light will be very dim.
- Do not worry if you do not see many lights.
- Just remember to press the button when you are sure.
- The lights will brighten up later on.

(Continued on next page)

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Supra-threshold: Multiple stimulus

Threshold set by age

- The test is going to take about 2 minutes. Make sure you are comfortable.
- Keep looking at the central red light.
- Keep your eye as still as possible
- Just tell me the number of lights that you see in each flash.
- I may ask you to tell me where the lights were that you saw.

Add when setting the threshold by measurement

- To begin with the lights will be fairly bright.
- They will then get dimmer and dimmer until you cannot see them.
- Do not guess. If you are not sure that you saw any lights, say "none".

(Continued on next page)

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Zata Threshold tests

- The test is going to take about 5 minutes. Make sure you are comfortable.
- Press your response button when you see a light flash.
- You will not see a light every time; some presentations are deliberately blank.
- Do not guess. If you are not sure that you saw a light, do not press the button.
- Keep looking at the central red light.
- Keep your eye as still as possible.
- If you want to take a break, hold down the response button. The test will pause until you release it.
- The first few presentations are a demonstration, so do not worry if you make a mistake.
- As the test proceeds, you will see fewer and fewer lights; this is normal.

Drivers test

- The test is going to take about 4 minutes. Make sure you are comfortable.
- Press your response button when you see a light flash.
- You will not see a light every time; some presentations are deliberately blank.
- Do not guess. If you are not sure that you saw a light, do not press the button.
- Keep looking at the central red light. On occasions the red light will move to a new position; follow it with your eyes.
- Keep your eyes as still as possible.
- If you want to take a break, hold down the response button. The test will pause until you release it.
- The first few presentations are a demonstration, so do not worry if you make a mistake.

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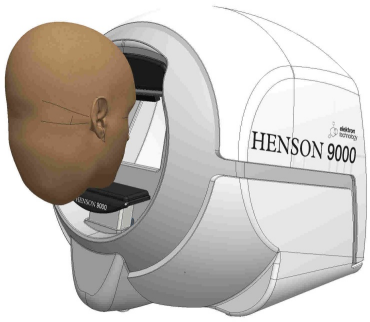
3.4 Align the Patient

At the beginning of the test the patient should be correctly aligned with the instrument. If the patient is positioned too far to one side or the other, there is a danger that they may miss some of the stimuli.

The patient should be seated comfortably, and should position their head as shown below.



the chinrest height should be altered using the on-screen buttons so that the patient can comfortably rest their chin against it and their eye is visible in the on-screen fixation monitor.

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3.5 Analysing the Results

There is often a need to analyse the results of a visual field test.

The Henson software contains a series of analysis routines for both threshold and suprathreshold strategies.

Threshold strategies (ZATA and Full)

The threshold programs generate the indices:

Mean Defect

Standard Deviation of the Defect

They also calculate, for each test location, the Total Defect (the difference between the threshold and that of an age corrected normal eye) and the Pattern Defect (the total defect adjusted for the overall height of the hill of vision).

The Total and Pattern Defects are displayed in 2 formats, the actual values in decibels (dB) and as symbols which represent the probability of each location being normal.

Suprathreshold strategies

Both the Multiple and Single stimulus suprathreshold programs analyse the visual field results in two ways:

They give the number of missed stimuli in the whole field.

They give a measure of the probability that the result comes from a normal eye. This quantification is given in the form of a horizontal scale (see below) divided into 3 regions, normal, suspect and defect. The borders correspond to 10% (normal/suspect) and 0.1% (suspect/defect) probability values. The length of the blue bar represents the confidence of the estimate. The length is dependent upon the number of tested locations, it shortens as the number increases.

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Part IV

4 The Henson Perimeter tests

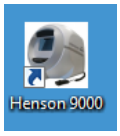
Available tests

The following threshold programs are available with the :

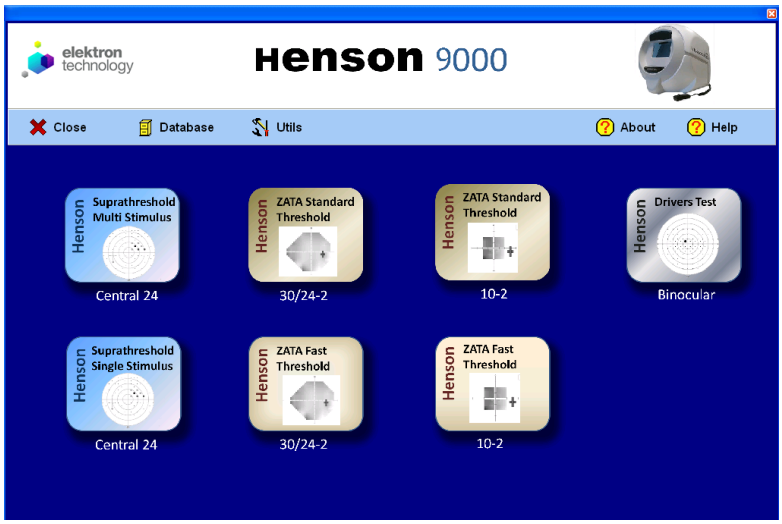
- **Multiple Stimulus Supra-Threshold**: Choose this if speed is important. It is approximately twice as fast as the Single Stimulus supra-threshold strategy in patients with little or no defect. This is a manually operated test
- **Single Stimulus Supra-Threshold**: Choose this test to screen large numbers of patients. This is a fully automated test where the patient presses a response button[29] every time they see a stimulus.
- **ZATA** (Zippy Adaptive Threshold Algorithm): This is the latest threshold strategy to be incorporated in the Henson perimeters. It is faster and more accurate than the Full and Fast Threshold programs and will normally be program of choice. The ZATA program uses a Baysian algorithm and adaptive terminating criteria to make the best use of prior data and all test findings.
- **Drivers**: The Drivers Test program is designed to see whether or not a patient meets the visual field requirements for driving.

To select a test:

1. Double-click the desktop icon to start the test software.



2. Click the appropriate test button on the start-up screen.



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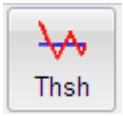
4.1 Suprathreshold tests

There are two different supra-threshold programs provided with the software, multiple[69] and single[51] stimulus:

- Both programs incorporate several levels[57] of testing.
- Both can be run in an age-related or threshold-related[54] mode.

The Options[108] file specifies which mode the starts up in.

You can override this for the current test by pressing the Threshold button on the toolbar[84].



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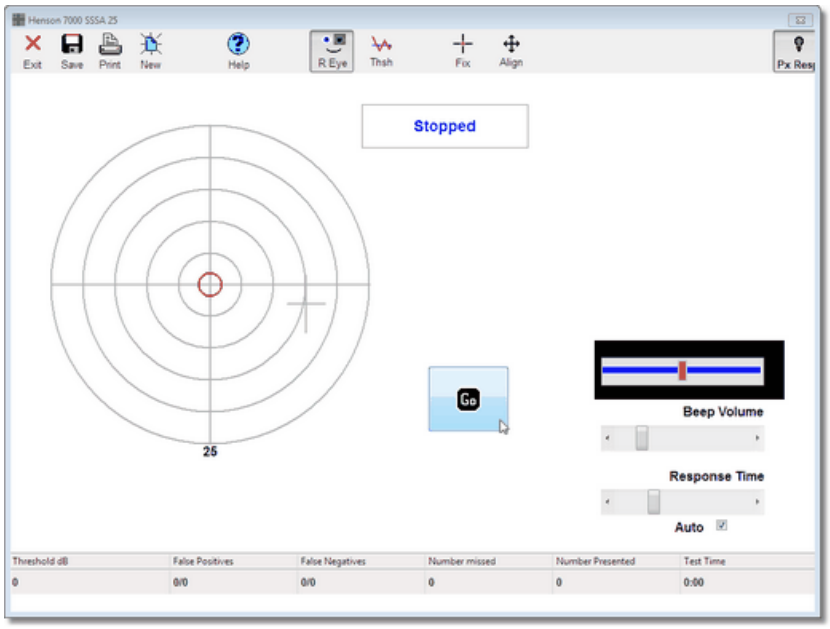
4.1.1 Single Stimulus Test

By now, you should already have entered the date of birth[38], read out the patient instructions[39] and aligned[42] the patient

The test screen will be visible.



Select an eye to test

By default the software starts with testing the Right eye. If you want to test the left eye, click the Eye button on the toolbar.

Right eye being tested

Left eye being tested

Press Go

When the patient is ready, click the Go button. (At any time, you can stop the test by pressing Stop.)

(Continued on next page)

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Talk the patient through Demo mode

The program will enter a demonstration mode. This consists of 10 presentations where the responses of the patient are not saved.

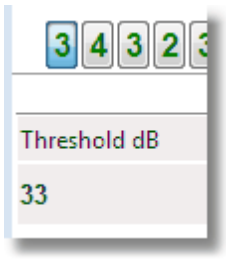
It is a good idea to tell the patient not to be concerned if they make some errors at the beginning of the test, as the results from the first few presentations are not recorded.

Check the threshold

This step depends on the default threshold measurement method, as defined in the Options[110] program:

- If the threshold is set by age, you don't need to do anything.
- If the threshold is to be measured, the threshold is determined at four locations (one in each quadrant) with a repetitive bracketing strategy known as the Heart[85] algorithm.

Once the threshold has been set it will be displayed in the bottom left corner of the screen.



(Continued on next page)

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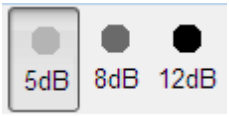
Run through the main test

During the test you will see points appear on the target screen as the patient sees or misses the points presented.

- A seen point is represented by a small square
- A miss is represented by a dot the shade of the test intensity (5, 8 or 12dB). These icons are shown on the toolbar.



- The test will present the 28 test points and then stop.
- If the option to extend the test (if any points are missed) is active in Options[110], the test may continue on to presenting 68 points.
- Each point will be presented at 5dB brighter than the patient's threshold.
- If a point is missed:
  - It will be returned to and presented again.
  - If missed again it will be recorded as a 5dB miss.
  - It will then be presented at 8dB over threshold:
    - If seen, it will be marked as a 5dB miss
    - If not seen it will be presented at 12dB over threshold.
  - This is the final test level; if missed here it will be marked as a 12dB miss. If seen at the 12dB level it will be marked as an 8dB miss.

Completing the test

- At the end of the test, you have the option to extend[57] the test (if not already done so automatically) or add in[58] extra test points.
- If the field is all clear, press the Eye button on the toolbar to test the other eye.

- The field plot will clear and you are ready to test again.

The results of both eye tests are recorded on the same printout and in the same database record, so there is no need to save or print until you have finished both eyes.

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4.1.1.1 Single Stimulus Suprathreshold Contents

- Introduction 51
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- Extending 57 the test
- Adding/correcting 58 test locations
- Quantification 60
- Autotiming 52
- Catch Trials 60
- Printing 63
- Saving the results 61

4.1.1.1.1 Introduction (Single stimulus)

The Single Stimulus supra-threshold test is ideal for screening the visual field.

The test is fully automatic and requires no intervention by the perimetrist other than to instruct 57 the patient on what to do, ensure that they have the correct refractive correction 30 in front of their eye and that they are correctly positioned 42.

The initial test intensity is calculated to be 5dB above the patient's threshold. The threshold 54 is derived either from the patient's age or from a measurement taken at the beginning of the test.

- Stimuli that are not seen by the patient are presented a second time at the same intensity.
- If missed on both occasions, the stimulus is marked as a miss and presented at 8dB above the threshold estimate.
- If missed at this intensity it will be presented at 12dB above the estimate. A grey scale indicates the depth of defect (5, 8 or 12dB).

The patient responds to each seen presentation by pressing their response button 29.

This test incorporates a number of false positive 'catch' trials 60 . These help to discourage the patient from predicting the next presentation.

The test can be customised the with the addition 58 of extra stimulus locations.

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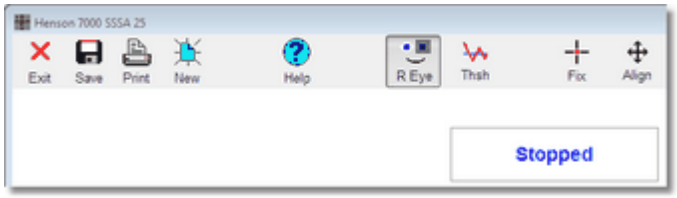
4.1.1.1.2 Test Status Indicator

Near the top of the test window, a message indicates the current status of the test:



Ready	Ready to begin testing; Press **Go** after entering date of birth
Stopped	Paused; press **Go** to resume
Demonstrating	At the start of single stimulus tests, 10 presentations where the responses of the patient are not saved
Finding threshold	Test sequence that runs if threshold is set to be measured (in Options 110, or by overriding the default setting)
Testing	Single stimulus test program is running

4.1.1.1.3 Auto timing

This option is available on all single stimulus strategies.

When the Auto timing box is checked, the patient's response times (the time between the stimulus presentation and the patient pressing the response button) are used to adjust the inter-stimulus interval.

- If the patient responds rapidly, the inter-stimulus interval will be reduced (the speed of presentations increases).
- If they respond slowly, the inter-stimulus interval will increase (the speed of presentations will decrease).

Autotiming helps to maintain patient attention and reduce the total test time.

- You can override the auto timing at any stage of the examination by dragging the **Response Time** slider or pressing the arrows at either end.
- You can turn off auto timing by unticking the check box.

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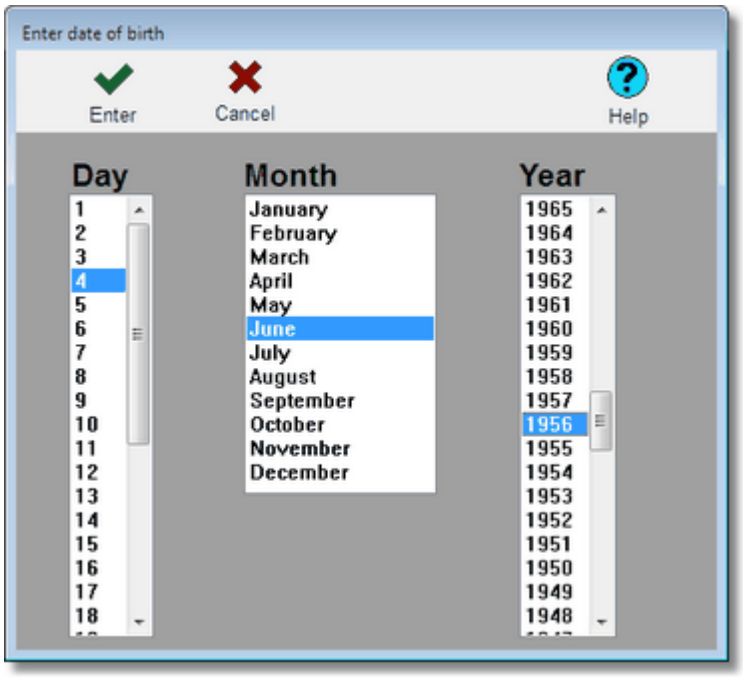
4.1.1.1.4 Entering the patient's date of birth

At the start of nearly all of the tests, you need to enter the patient's date of birth.

- By default, the patient's age is used to establish the starting test level for the Suprathreshold tests. (You can change the method used to determine the threshold in the Options program[110].)
- The age is also automatically added to the database record, and to any printouts.

To enter the date of birth:

1. Select the Day, Month and Year from the lists.
2. Press the **Enter** button.


Enter date of birth
Enter
Cancel
Help
Day
Month
Year
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
January February March April May June July August September October November December
1965 1964 1963 1962 1961 1960 1959 1958 1957 1956 1955 1954 1953 1952 1951 1950 1949 1948

4.1.1.1.5 Fixation targets

The has two fixation targets:

- A small central red spot
- Four peripheral spots located 6 degrees from the central point along the 0, 90, 180 and 270 meridians. The four peripheral spots are provided for

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patients who have lost central vision. They should be instructed to look at the centre of the four-point pattern.

You can switch between fixation targets at any stage of the examination by pressing the **Fix** button (the icon on the button toggles to denote which fixation target is currently in use).

The appearance of the button represents the current fixation target.

4.1.1.1.6 Swapping the eye under test

You can swap between the right and left eye at any time by pressing the **Eye** button. The icon shows which eye is currently being tested.

Right eye being tested

Left eye being tested

Note: You will not lose data when you swap from one eye to the other.

This facility is particularly useful when screening the visual field with supra-threshold stimuli. If the first eye was OK and the second eye showed up a defect then it is possible to go back to the first eye and test some more locations now that the suspicion of a defect has been raised by the result from the second eye.

Remember the prints[63] and saves[61] both eyes together.

4.1.1.1.7 Overriding the default Suprathreshold test level

To select a different method at the onset of a test:

1. Press the threshold (Thsh) button.
2. Select a method from the Threshold override screen.

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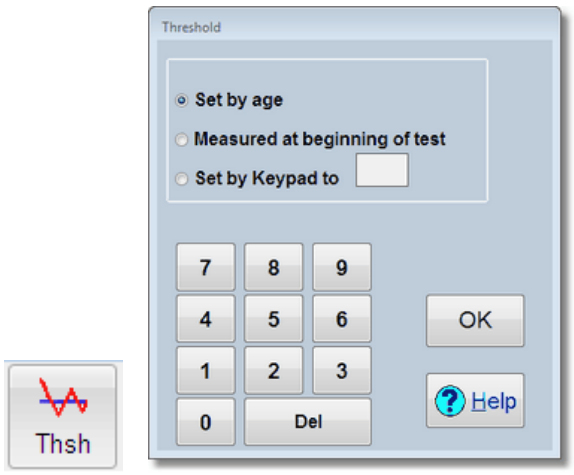

3. (**by Keypad**) Enter the desired value between 10dB and 42dB.
4. Press **OK**.

Note: The system will revert to the default method for the next test. To make a change permanent, you will need to change the default setting in the Options[108] program.

(Continued on next page)

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More information

The supra-threshold test intensity of both Single and Multiple Stimulus tests can be set according to the age of the patient, by direct measurement, or to a specific value (between 10dB and 42dB).

- **Set by age**: This method the established relationship between age and sensitivity to set the test intensity. This is the fastest strategy but can lead to errors when a patient's sensitivity departs from the average value for their age, e.g. when there are media opacities. This strategy is particularly well suited to screening for diseases such as glaucoma.
- **Measured at beginning of test**: In this method, the test intensity is established at the beginning of the field test by a short routine that determines the patient's sensitivity.
  - In the single stimulus[51] this is done automatically. At four locations, one in each quadrant, the threshold is determined with a repetitive bracketing strategy known as the HEART[85] algorithm.
  - In the multiple stimulus[69] test, the MSSP threshold estimate is established by a semi-automatic[75] routine. After each presentation the patient is asked if they saw any stimuli. The response is entered into the computer, which then selects a new pattern and test intensity. This sequence is repeated until the threshold has been established, after which the software automatically switches into the supra-threshold phase of the examination.
- **Set by Keypad to**: Sometimes you may want to set the test intensity to a particular value, e.g. when following up a patient.

The current default method (by age or measurement) is defined in the Options[108] program.

4.1.1.1.8 Demonstrating the test

All the single stimulus tests begin with a demonstration. This consists of 10 presentations where the responses of the patient are not saved.

It is a good idea to tell the patient not to be concerned if they make some errors at the beginning of the test, as the results from the first few presentations are not recorded.

If further demonstration is required then the perimetrist should stop the test and start again after re-instructing the patient.

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4.1.1.1.9 Patient Instructions

The patient instructions for Supra-Threshold stimulus tests vary according to whether or not the test intensity[54] is set by the *age* of the patient or by *measurement*.

Supra-threshold: Single stimulus

Threshold set by age

- The test is going to take about 2 minutes. Make sure you are comfortable.
- Press your response button when you see a light flash.
- You will not see a light every time; some presentations are deliberately blank.
- Do not guess. If you are not sure you that saw a light, do not press the button.
- Keep looking at the central red light.
- Keep your eye as still as possible.
- If you want to take a break, hold down the response key. The test will pause until you release the response key.
- The first few presentations are a demonstration, so do not worry if you make a mistake.

Add when setting the threshold by measurement

- At the beginning of the test the light will be very dim.
- Do not worry if you do not see many lights.
- Just remember to press the button when you are sure.
- The lights will brighten up later on.

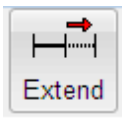
4.1.1.1.10 Extending the test

Each supathreshold program is composed of two levels.

- The first level is a quick screening test
- The second level is used when the first level gives a suspicious result, or when there is some other reason why the clinician feels that more data is needed (e.g. there is a family history of glaucoma).

To go to level two:

1. Press Extend.



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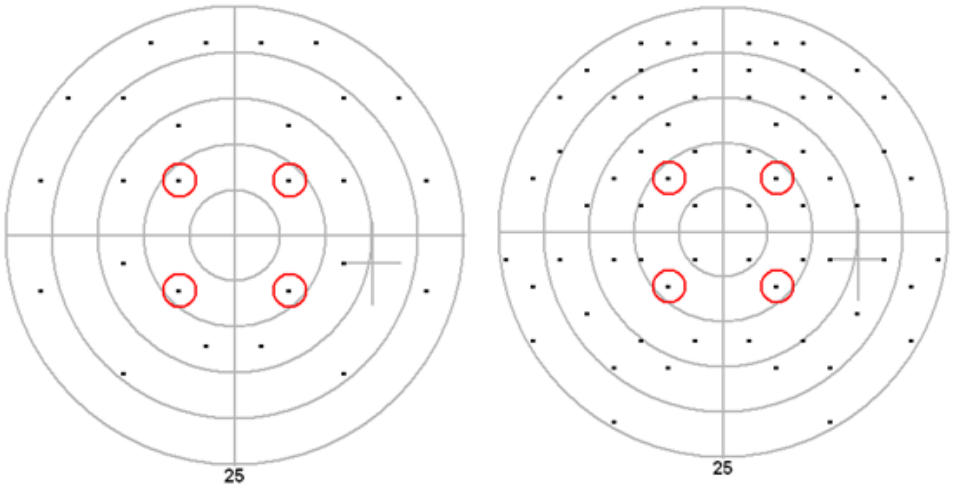
The figure below shows the distribution of stimuli in the two levels of the central visual field test (26 and 68 test locations).



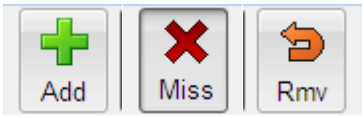
One of the important benefits of having a two-level test is that the perimetrist does not have to decide on how many stimuli to test at the onset of the examination. They can start off with a simple screening test and then Extend if necessary.

If the patient misses a non-blind spot stimulus in the basic screening test, the test should be extended. If the autoextend property is set in the Options[108] program this will occur automatically.

4.1.1.1.11 Adding and correcting presentations

You can mark a location as missed, re-test locations and remove missed test locations using the **Add**, **Miss** and **Rmv** buttons.

Rmv is useful for checking the result from a particular location, or removing artefactual data (such as that produced by a correcting lens rim or droopy eyelid).



The topics below explain how to use the buttons. You can perform these actions either during the test or at the end.

To enter a location as missed

- Make sure the Miss button is down, if not select the Miss button.
- Check that you have the correct suprathreshold intensity, if not select the correct button.
- Select the location over the chart area where the stimulus was missed.

To re-test an already tested location

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- Make sure the Add button is down, if not select the Add button.
- Check that you have the correct suprathreshold intensity, if not select the correct button.
- Select the location over the chart area of the screen where you want to present the stimulus.

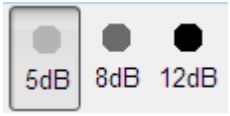
To correct a test location marked with a missed pattern

- Make sure the Rmv button is down, if not select the Rmv button.
- Select the location over the chart area where you want to remove the missed stimulus. The missed stimulus symbol will be replaced by a dot indicating that this location has been tested and seen.

Any of the above can be done either during the test or at the end of the test.

4.1.1.1.12 Changing the Suprathreshold Increment

There are 3 different Supra-threshold test increments, 5, 8 and 12dB.



Each of the test intensities has a button on the icon bar (see above). The button that appears to be down gives the currently selected increment.

Single stimulus

The suprathreshold increment is adjusted automatically during the test. If a stimulus is missed the program will come back to the location and re-test it at the same intensity. If it is missed a second time it will come back to test it at a higher intensity. It will repeat this until either the stimulus is seen or not seen at the highest intensity level (12 dB).

Multiple stimulus

This program starts off testing at 5dB above the threshold estimate. Stimuli missed twice at this increment should be presented at higher increments in order to measure the depth of the defect. The perimetrist has complete control over the test increment. They can change it at any point in the test

Adding/retesting

If you wish to manually present a stimulus at a given intensity with either the

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single or

multiple stimulus test select the appropriate intensity button and then select the location you wish to test, i.e. by clicking the left mouse button over the location on the displayed chart. The intensity can also be changed with the up/down arrow keys.

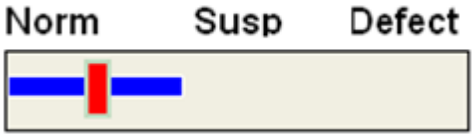
4.1.1.1.13 Quantification

There is often a need to reduce the large amount of data presented in a visual field chart to one or a series of numbers. This reduction is known as quantification.

Supra-Threshold strategies

Both the Multiple and Single stimulus supra-threshold programs quantify the visual field results in two ways:

- They give the number of missed stimuli in the whole field.
- They give a measure of the probability that the result comes from a normal eye. This quantification is given in the form of a horizontal scale (see below) divided into three regions: normal, suspect and defect. The borders correspond to 10% (normal/ suspect) and 0.1% (suspect/defect) probability values. The length of the blue bar represents the confidence of the estimate. The length is dependent upon the number of tested locations; it shortens as the number increases.



4.1.1.1.14 Catch Trials

The single stimulus test incorporates catch trials to give the perimetrist an estimate of the patient's reliability.

There are two types of catch trial:

- False positives: when the patient reported seeing a light when none was presented. They give an idea of how 'trigger happy' the patient was.
- False negatives (only in threshold tests): when the patient failed to press their response key when a stimulus was presented at a location previously seen by the patient. They give some idea of the patient's attention (or rather lack of it).

Both tests occur at random intervals throughout an examination. The results are given as a fraction, the top number representing the number of errors and the bottom number the number of catch trials. For example, False positives

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3/10 would indicate that the test had made 10 false positive catch trials and the patient had, in error, responded to 3 of them.

Normally the number of false positives should be less than 15%, and the number of false negatives less than 30% of the catch trials. False negatives increase if there is a visual field defect. This is due to the increased variability of the patient in areas of reduced sensitivity rather than the patient not paying attention to the perimetric task.

The relationship between catch trial responses and test-retest variability is not very good and the results from these trials should only act as a guide. Perimetrists can provide a more accurate estimate of the patient's reliability by simply observing them during the test. Perimetrists should, therefore, be encouraged to make comments on the visual field chart concerning the reliability of the result, e.g. Fixation excellent, Fixation poor etc.

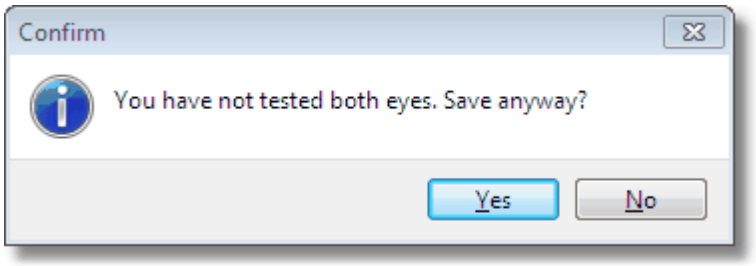
4.1.1.1.15 Saving Visual Field Data

Visual field data is saved in a powerful Windows database within the Henson software .

For all monocular tests you should test both eyes before pressing the save button as both eyes are saved as a single database record. The Drivers test is binocular and can only be saved after completion.

If you have not tested both eyes, you will see a warning.

Normally, you would press **No** and test the other eye.



Note: If you inadvertently press the save button after only testing one eye and then want to test the second eye and save it's results then you will have to start a new test by pressing the **New** button.

After you press the save button you will be presented with a database entry form in which you can enter the patient details (name, record number etc.). If you are working from prior data some of this information will be entered automatically although it can still be edited/changed.

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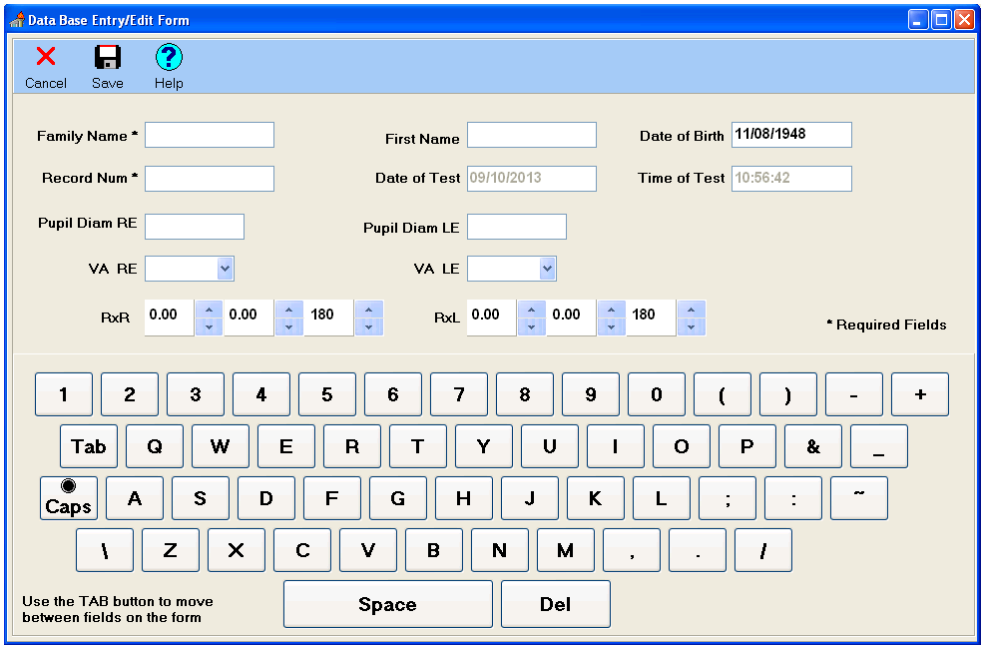

You must enter family name and record number as these are used for sorting and filing the data.

You must not use the following characters in the family name or record number
" * / : < > ? \ |

Visual acuities are selected from drop down boxes, refractive errors from 3 scroll boxes (Sphere, Cylinder and Axis).

(Continued on next page)

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Notes

- The date of test, time of test, date of birth and type of test are automatically entered by the software. The date and time of test come from the PCs internal clock, which needs to be correctly set via the Windows Control Panel.
- The Henson software saves a pdf file of the printout that can be used by practice management systems. For details on the coding of file names please contact your supplier.

4.1.1.1.16 Printing

The prints through the Windows environment, and as such can be linked with a wide range of printers (lasers, bubblejets, inkjets etc.).

Results for both eyes are printed at the same time. In the suprathreshold programs, results for the right and left eyes are placed side by side.

The practice name and address[109] will appear on the printout, along with any patient details you entered when saving[61] the visual field data in the database.

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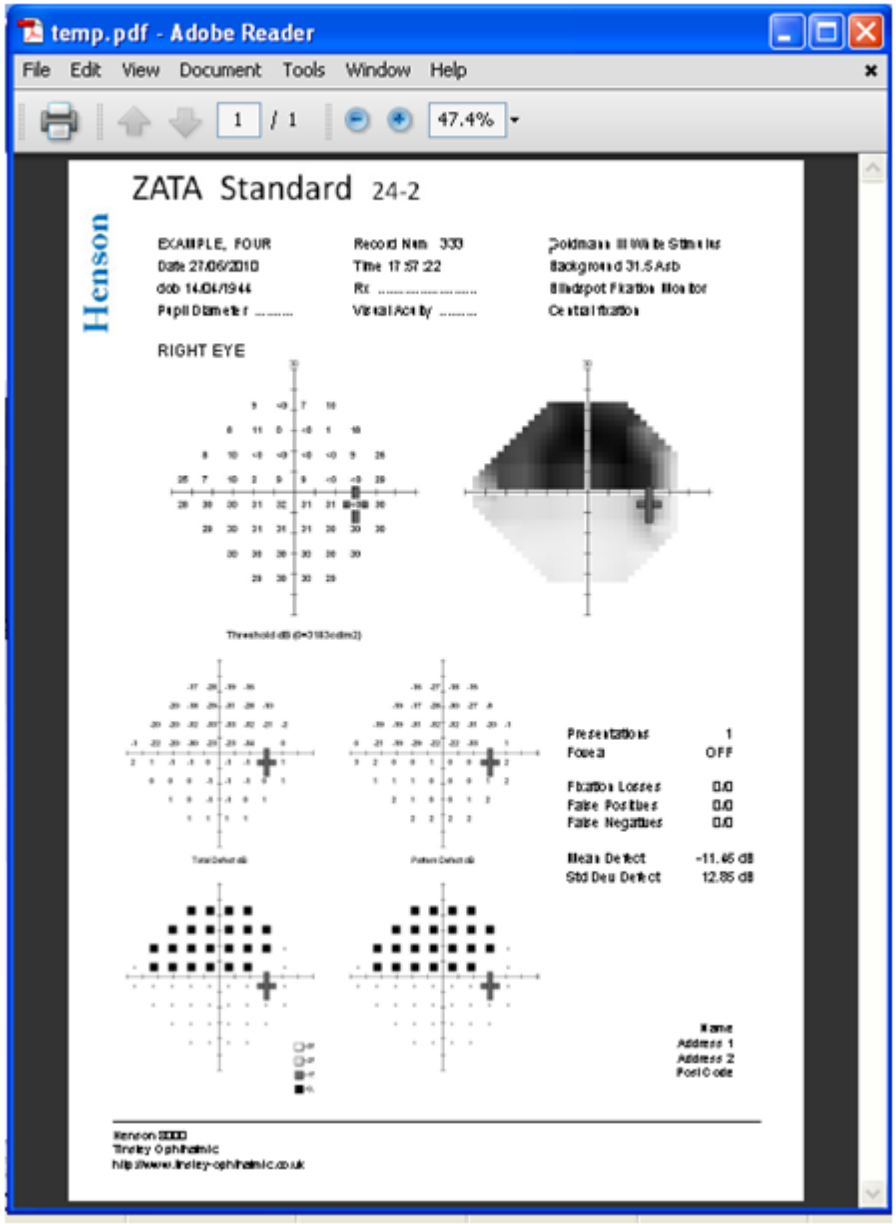

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To print the results of a field test:

1. Click the **Print** button in the toolbar of the field test.

   The software creates an Adobe Reader file (*.pdf) of the results.

2. Click the **Print** button in the Adobe Reader toolbar.
3. In the resulting Windows *Print* dialog, enter any options (e.g. select a printer, and enter the number of copies) and click **OK**.

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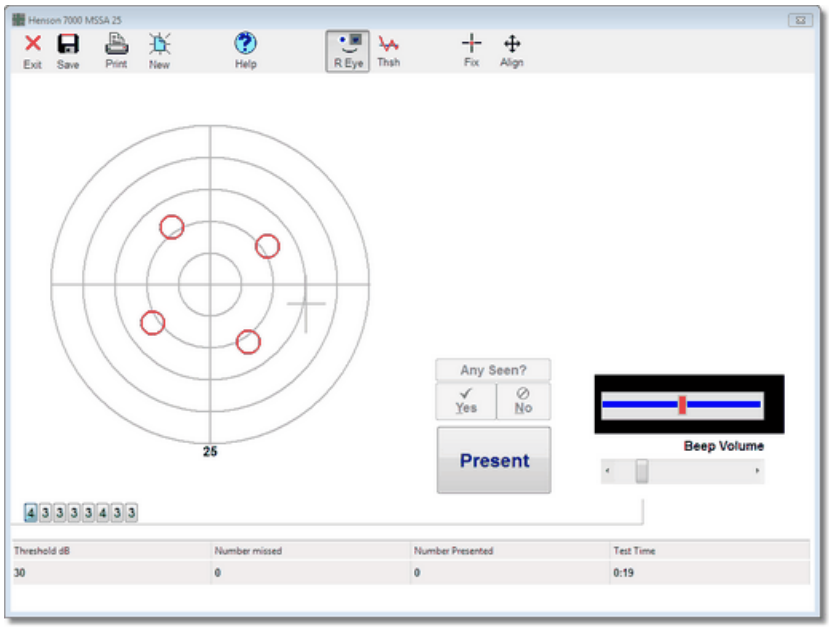
4.1.2 Multiple Stimulus Test

By now, you should already have entered the date of birth[38], read out the patient instructions[39] and aligned[42] the patient

The test screen will be visible:



Check the threshold

This step depends on the default threshold measurement method, as defined in the Options[110] program:

- If the threshold is set by age, you don't need to do anything; continue with the test.
- If the threshold is to be measured, the Present button will have Yes and No buttons above it.

1. Press the **Present** button (if you have a keyboard you can also press the Space bar).
2. The patient should respond with the number of stimulus lights they saw.
3. If the patient sees any lights, press **Yes**, otherwise press **No**.

During threshold testing we are not interested in the number, just whether any lights were seen, but it is good practice for the patient to call the number out.

Once the threshold has been set it will be displayed in the bottom left

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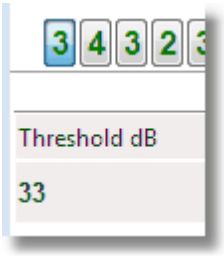
corner of the screen.



Run through the main test

1. Press the **Present** button.

2. If the patient's response agrees with the number of stimuli presented (as seen on the selected button and by the circles on the target screen), press the Fwd button to move onto the next pattern (keyboard users can also press the right arrow key).
    - If the patient is not sure, you can present the pattern of light again as many times as necessary.
    - If the patient has no field loss then you will complete the 28 point screening test in 8 presentations.

If the patient misses some stimuli

If the patient has some field loss, they will report back an incorrect number of stimuli seen on one or more of the test patterns.

1. Present the appropriate patterns again and instruct the patient to describe the locations (e.g. using 'clock face' descriptions such as "one o'clock and 8 o'clock, missing the one at 10 o'clock".
2. Press the **Miss** button on the toolbar and then click on the red circle of the location that was missed.
3. The location will have a 5dB icon marked on it and the pattern number square will turn red.
4. Continue the test and return to the missed point at the end.

If the patient misses many points, it may be better to stop the test and run a single stimulus 48 test instead, as this is easier for the patient.

Completing the test

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At the end of the test, you can return to any points that have been marked as missed at the 5dB level:

1. Press the **Bwd**/**Fwd** buttons or click directly onto the pattern button.
2. Press the 8dB button on the toolbar and then press the **Present** button.
3. If the patient still does not see the missed point, you can mark it as missed by clicking the **Miss** button and clicking over the missed location.
4. Press the **12dB** button then **Present** the point again at this higher level.
5. Re-test all points missed at the 5dB level.

Notes:

- At the end of the test, you have the option to extend[57] the test (if not already done so automatically) or add in[58] extra test points.
- If the field is all clear, press the Eye button on the toolbar to test the other eye.

- The field plot will clear and you are ready to test again.

The results of both eye tests are recorded on the same printout and in the same database record, so there is no need to save or print until you have finished both eyes.

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4.1.2.1 Multiple Stimulus Suprathreshold Contents

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4.1.2.1.1 Introduction (Multi stimulus)

Multiple stimulus supra-threshold tests are used to rapidly screen the visual field. The use of multiple stimulus patterns makes the test approximately twice as fast as a single stimulus test. The multiple stimulus tests are semi-automated and require more perimetrist involvement than the single stimulus tests. With a skilled perimetrist this can result in more reliable results with less variability.

Each presentation is composed of a pattern of 2, 3 or 4 stimuli.

1. The patient responds to each presentation by telling the perimetrist how many stimuli they saw.
2. If the patient reports the wrong number of stimuli then the perimetrist repeats the presentation.
3. If on the second presentation the patient still reports the wrong number of stimuli, the perimetrist asks the patient where the stimuli they saw were. Any missed stimuli are then marked as misses 58. It is often useful when trying to establish which stimuli were missed to ask the patient to report the clock hour positions of the seen stimuli.
4. If on the second presentation the patient reported the correct number of test locations then the perimetrist should proceed to the next pattern. In this case it is assumed that the error in the first presentation was a false one.
5. If there is still some doubt, the perimetrist can present the pattern a third time.

There is no limit to the number of times the perimetrist can present a pattern.

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Missed locations can be tested at higher intensity[59] levels to quantify the depth of any defect.

At the beginning of the test the threshold[71] is determined. Stimuli are then presented at 5dB above this threshold estimate.

The test has 2 levels[76], it starts with a quick 26 test point screening that can be extended to increase the number of stimuli to 68.

The test can be customised[77] with the addition of extra stimulus locations.

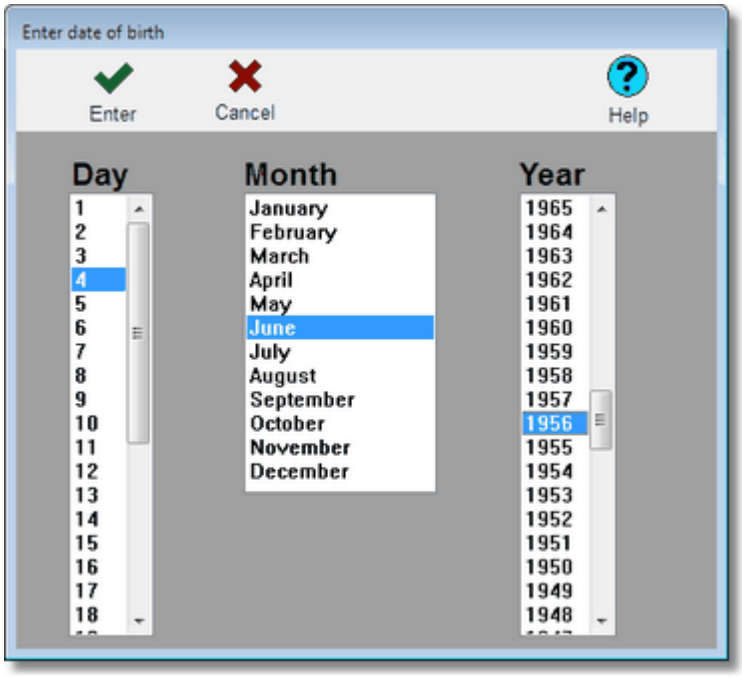
4.1.2.1.2 Entering the patient's date of birth

At the start of nearly all of the tests, you need to enter the patient's date of birth.

- By default, the patient's age is used to establish the starting test level for the Suprathreshold tests. (You can change the method used to determine the threshold in the Options program[110].)
- The age is also automatically added to the database record, and to any printouts.

To enter the date of birth:

1. Select the Day, Month and Year from the lists.
2. Press the **Enter** button.


Enter date of birth
Enter
Cancel
Help
Day
Month
Year
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
January February March April May June July August September October November December
1965 1964 1963 1962 1961 1960 1959 1958 1957 1956 1955 1954 1953 1952 1951 1950 1949 1948

4.1.2.1.3 Patient Instructions

The patient instructions for Supra-Threshold stimulus tests vary according to whether or not the test intensity[54] is set by the *age* of the patient or by *measurement*.

Suprathreshold: Multiple stimulus

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Threshold set by age

- The test is going to take about 2 minutes. Make sure you are comfortable.
- Keep looking at the central red light.
- Keep your eye as still as possible
- Just tell me the number of lights that you see in each flash.
- I may ask you to tell me where the lights were that you saw.

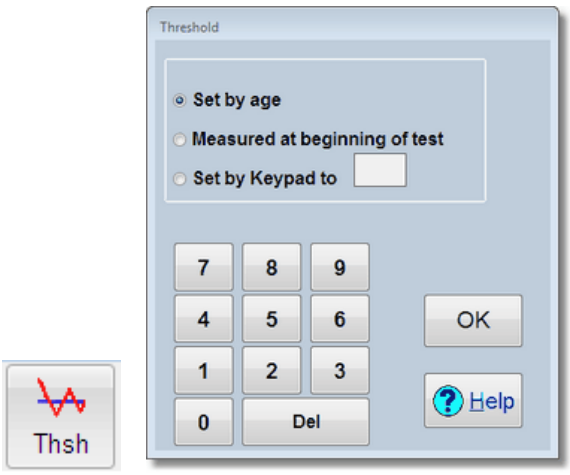
Add when setting the threshold by measurement

- To begin with the lights will be fairly bright.
- They will then get dimmer and dimmer until you cannot see them.
- Do not guess. If you are not sure you saw any lights, say "none".

4.1.2.1.4 Overriding the default Suprathreshold test level

To select a different method at the onset of a test:

1. Press the threshold (Thsh) button.
2. Select a method from the Threshold override screen.



3. (**by Keypad**) Enter the desired value between 10dB and 42dB.
4. Press **OK**.

Note: The system will revert to the default method for the next test. To make a change permanent, you will need to change the default setting in the Options[108] program.

(Continued on next page)

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More information

The supra-threshold test intensity of both Single and Multiple Stimulus tests can be set according to the age of the patient, by direct measurement, or to a specific value (between 10dB and 42dB).

- **Set by age**: This method the established relationship between age and sensitivity to set the test intensity. This is the fastest strategy but can lead to errors when a patient's sensitivity departs from the average value for their age, e.g. when there are media opacities. This strategy is particularly well suited to screening for diseases such as glaucoma.
- **Measured at beginning of test**: In this method, the test intensity is established at the beginning of the field test by a short routine that determines the patient's sensitivity.
  - In the single stimulus[51] this is done automatically. At four locations, one in each quadrant, the threshold is determined with a repetitive bracketing strategy known as the HEART[85] algorithm.
  - In the multiple stimulus[69] test, the MSSP threshold estimate is established by a semi-automatic[75] routine. After each presentation the patient is asked if they saw any stimuli. The response is entered into the computer, which then selects a new pattern and test intensity. This sequence is repeated until the threshold has been established, after which the software automatically switches into the supra-threshold phase of the examination.
- **Set by Keypad to**: Sometimes you may want to set the test intensity to a particular value, e.g. when following up a patient.

The current default method (by age or measurement) is defined in the Options[108] program.

4.1.2.1.5 Starting a Suprathreshold Multiple Stimulus test

Before starting the test you should ensure that:

- The patient has the correct refractive correction[30] in front of the test eye
- The patient's eye is as close as possible to the eyepiece

Changing the beep volume

- Drag the beep volume slider to the required volume level
- Drag it all the way to the left to turn the beep off.

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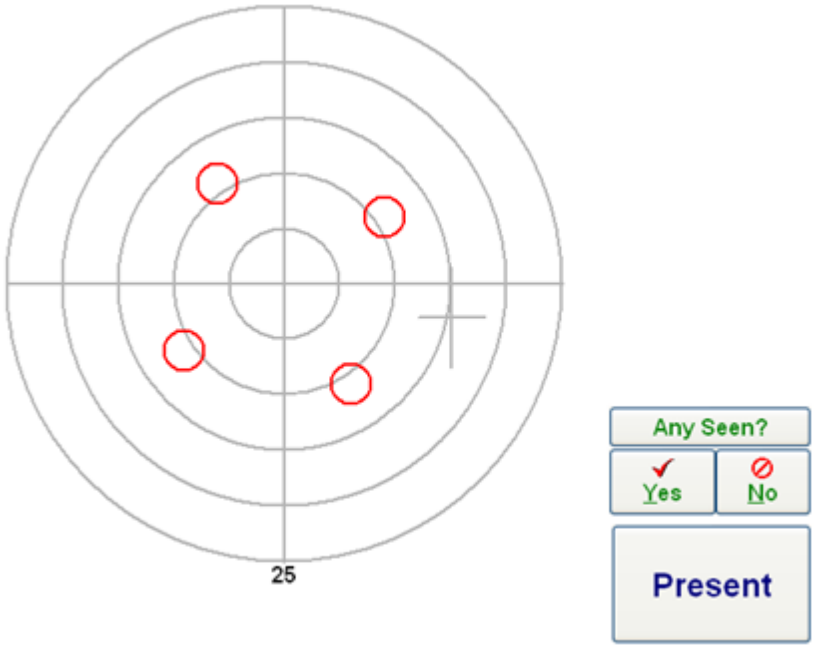
4.1.2.1.6 Establishing test intensity: Multiple Stimulus test

With the threshold-related Multiple Stimulus supra-threshold test it is necessary to get an estimate of the patient's threshold before starting the supra-threshold presentations.



To obtain the threshold estimate:

1. Instruct[70] the patient.
2. Press **Present** to present the current pattern of stimuli. You can repeat this if necessary. You can also use the Space bar to present the stimuli.
3. If the patient reports that they saw some of the stimuli, click **Yes**. If none are seen, click **No**. You can also use the 'Y' and 'N' keys.
4. Keep repeating 2-3 above. Once the threshold has been established the program will automatically switch into the supra-threshold testing.

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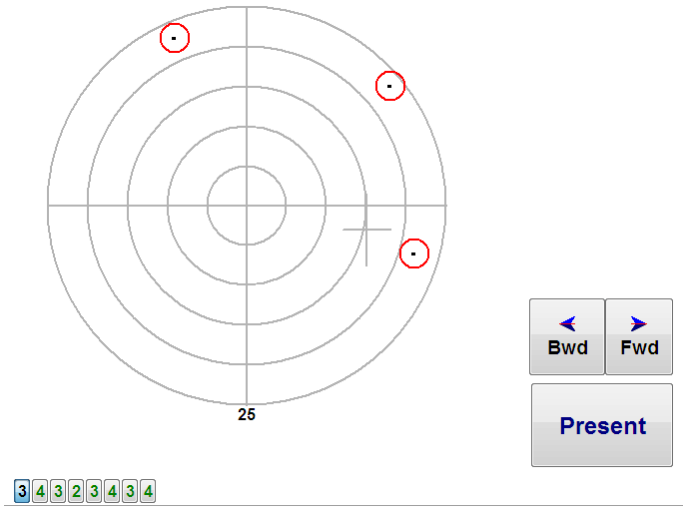
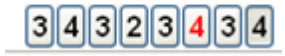
4.1.2.1.7 Presenting and selecting different Multiple Stimulus patterns



The currently selected multiple stimulus pattern is displayed on the screen by the red circles.

- To present this pattern to the patient, press the **Present** button.
- To go onto the next pattern press the **Fwd** arrow key.
- To go back press the **Bwd** arrow key.

All the patterns within the current test level are represented by a line of buttons along the bottom of the screen:



You can go to a specific pattern by selecting the appropriate pattern button.

Each of the pattern buttons gives the number of stimuli in the pattern. This number starts off in green and goes to black once the pattern has been presented. If there is a missed stimulus in the selected pattern then the number is shown in red.

When you extend the test to a higher level[76], additional pattern buttons will appear.

4.1.2.1.8 Missed stimuli in Multiple Stimulus suprathreshold test

It is not unusual for a patient with no visual field loss to miss the occasional stimulus. To differentiate between these and misses due to genuine field loss, the pattern should be presented a second time; only if the patient again reports an incorrect number of stimuli should you proceed to establish which stimuli were missed and enter them into the perimeter.

To establish which stimuli were missed:

1. Ask the patient where they saw stimuli. It is often helpful at this stage to tell the patient to consider the bowl as a clock face and to give the hour positions of the stimuli.

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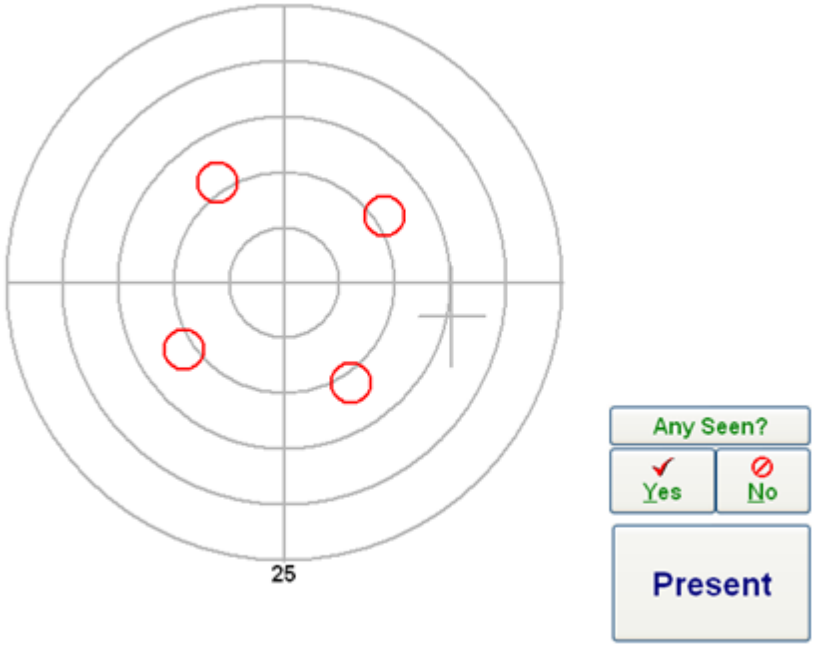
2. Once you have established which stimuli were missed press the **Miss** button and then click on the missed stimulus location on the displayed chart.
3. To correct mistakes (i.e. remove missed stimuli) press the **Rmv** button and click over the mistake.

4.1.2.1.9 Setting the test intensity

Stimuli missed at a 5dB increment should be tested at a higher intensity[59] .

There is a special test sequence for establishing the patient's threshold at the beginning of a Multiple Stimulus supra-threshold test.



How the test sequence works

The test sequence for establishing the threshold starts off at an intensity estimated to be above the patient's threshold.

Note: When running this phase of a test it is important to tell the patient what is going to happen. You should mention that you are going to present some stimuli and that they should tell you how many they see. After the first pattern in which they see some stimuli you should then add that you are going to gradually make them dimmer and dimmer until they can no longer see any stimuli.

By informing the patient of what is going to happen, you improve the reliability of their responses.

- If none of the stimuli are seen then the intensity of the next presentation will be 4dB brighter.

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- If one or more are seen then the intensity of the next presentation will be 1dB dimmer.
- Each time the patient sees one or more stimuli the intensity of the next presentation is reduced by 1dB.
- When the test sequence reaches the intensity at which the patient cannot see any of the stimuli, an additional pattern at the same intensity is presented. If this is not seen, the threshold is taken as 2dB higher than the current level and the supra-threshold test intensity is set at 5dB above the threshold estimate.
- If the patient reports seeing some of the stimuli in the additional pattern, the sequence continues to dim the stimuli, in 1dB steps, until the patient again reports that they cannot see any of the stimuli.

Running the test sequence

1. Press the **Present** button.
2. Ask the patient if they saw any of the stimuli.
3. Depending on the patient's response press either the Any Seen? **Yes** or **No** button.
4. A new pattern will be selected and the process repeated.
5. Once the threshold has been established the program will automatically proceed to the supra-threshold stage of the test.

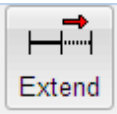
4.1.2.1.10 Extending the test

Each supathreshold program is composed of two levels.

- The first level is a quick screening test
- The second level is used when the first level gives a suspicious result, or when there is some other reason why the clinician feels that more data is needed (e.g. there is a family history of glaucoma).

To go to level two:

1. Press Extend.



The figure below shows the distribution of stimuli in the two levels of the central visual field test (26 and 68 test locations).

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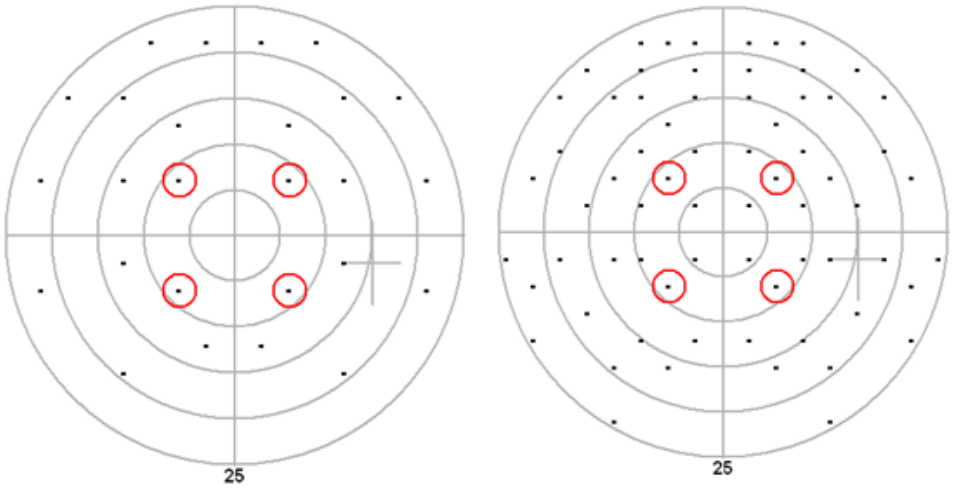


One of the important benefits of having a two-level test is that the perimetrist does not have to decide on how many stimuli to test at the onset of the examination. They can start off with a simple screening test and then Extend if necessary.

If the patient misses a non-blind spot stimulus in the basic screening test, the test should be extended. If the autoextend property is set in the Options[108] program this will occur automatically.

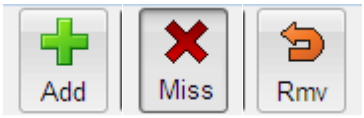
4.1.2.1.11 Adding and correcting presentations

Next topic: Adding and correcting presentations[77]

You can mark a location as missed, re-test locations and remove missed test locations using the **Add**, **Miss** and **Rmv** buttons.

Rmv is useful for checking the result from a particular location, or removing artefactual data (such as that produced by a correcting lens rim or droopy eyelid).

1. Press a button to toggle its state between enabled and disabled. The image below shows the Miss button enabled:



The topics below explain how to use the buttons. You can perform these actions either during the test or at the end.

To enter a location as missed

1. Enable the **Miss** button.
2. Check that you have the correct suprathreshold intensity[59]. If not, press the correct button.
3. Click on the chart where the stimulus was missed.

To re-test an already tested location

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1. Enable the **Add** button.
2. Check that you have the correct suprathreshold intensity[59]. If not, press the correct button.
3. Click on the chart where you want to re-present the stimulus.

To correct a test location marked with a missed pattern

1. Enable the **Rmv** button.
2. Click on the missed stimulus that you want to remove. The missed stimulus symbol will be replaced by a dot indicating that this location has been tested and seen.

Next topic: Quantification[78]

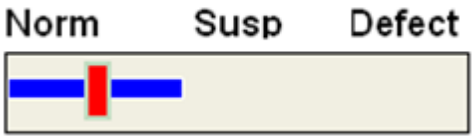
4.1.2.1.12 Quantification

There is often a need to reduce the large amount of data presented in a visual field chart to one or a series of numbers. This reduction is known as quantification.

Supra-Threshold strategies

Both the Multiple and Single stimulus supra-threshold programs quantify the visual field results in two ways:

- They give the number of missed stimuli in the whole field.
- They give a measure of the probability that the result comes from a normal eye. This quantification is given in the form of a horizontal scale (see below) divided into three regions: normal, suspect and defect. The borders correspond to 10% (normal/ suspect) and 0.1% (suspect/defect) probability values. The length of the blue bar represents the confidence of the estimate. The length is dependent upon the number of tested locations; it shortens as the number increases.



Next topic: Supra-threshold Heart algorithm[59]

4.1.2.1.13 Saving Visual Field Data

Visual field data is saved in a powerful Windows database within the Henson software .

For all monocular tests you should test both eyes before pressing the save button as both eyes are saved as a single database record. The Drivers test is

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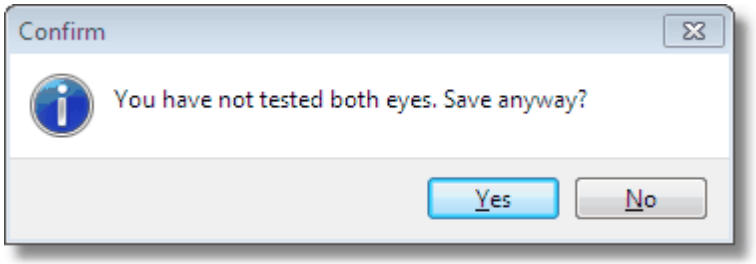
binocular and can only be saved after completion.

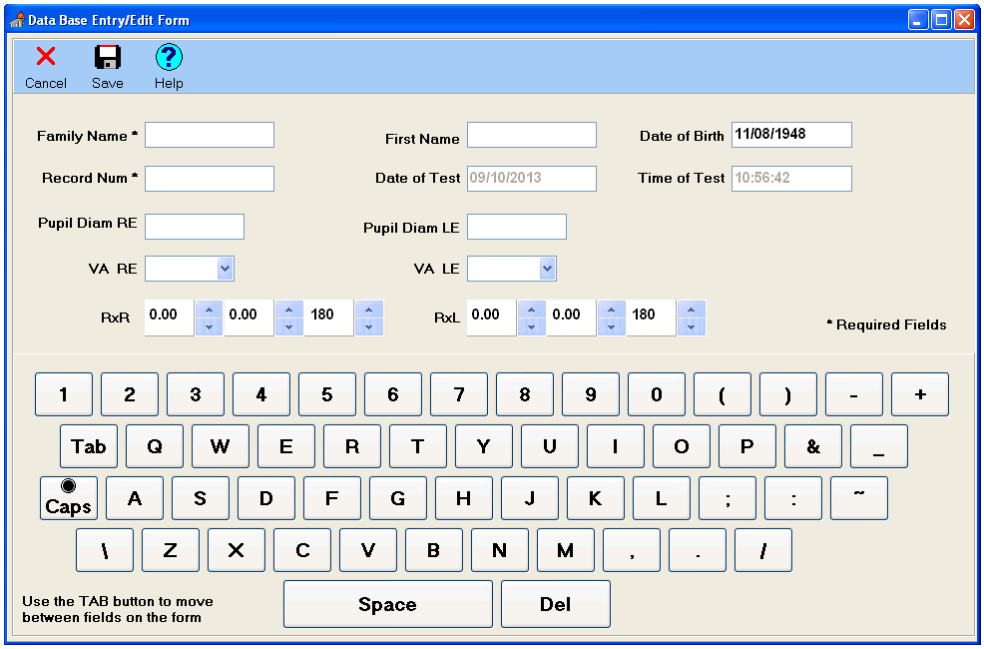
If you have not tested both eyes, you will see a warning.

Normally, you would press **No** and test the other eye.



Note: If you inadvertently press the save button after only testing one eye and then want to test the second eye and save it's results then you will have to start a new test by pressing the **New** button.

After you press the save button you will be presented with a database entry form in which you can enter the patient details (name, record number etc.). If you are working from prior data some of this information will be entered automatically although it can still be edited/changed.



You must enter family name and record number as these are used for sorting and filing the data.

You must not use the following characters in the family name or record number
" * / : < > ? \ |

Visual acuities are selected from drop down boxes, refractive errors from 3

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scroll boxes (Sphere, Cylinder and Axis).

(Continued on next page)

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Notes

- The date of test, time of test, date of birth and type of test are automatically entered by the software. The date and time of test come from the PCs internal clock, which needs to be correctly set via the Windows Control Panel.
- The Henson software saves a pdf file of the printout that can be used by practice management systems. For details on the coding of file names please contact your supplier.

4.1.2.1.14 Printing

The prints through the Windows environment, and as such can be linked with a wide range of printers (lasers, bubblejets, inkjets etc.).

Results for both eyes are printed at the same time. In the suprathreshold programs, results for the right and left eyes are placed side by side.

The practice name and address[109] will appear on the printout, along with any patient details you entered when saving[61] the visual field data in the database.

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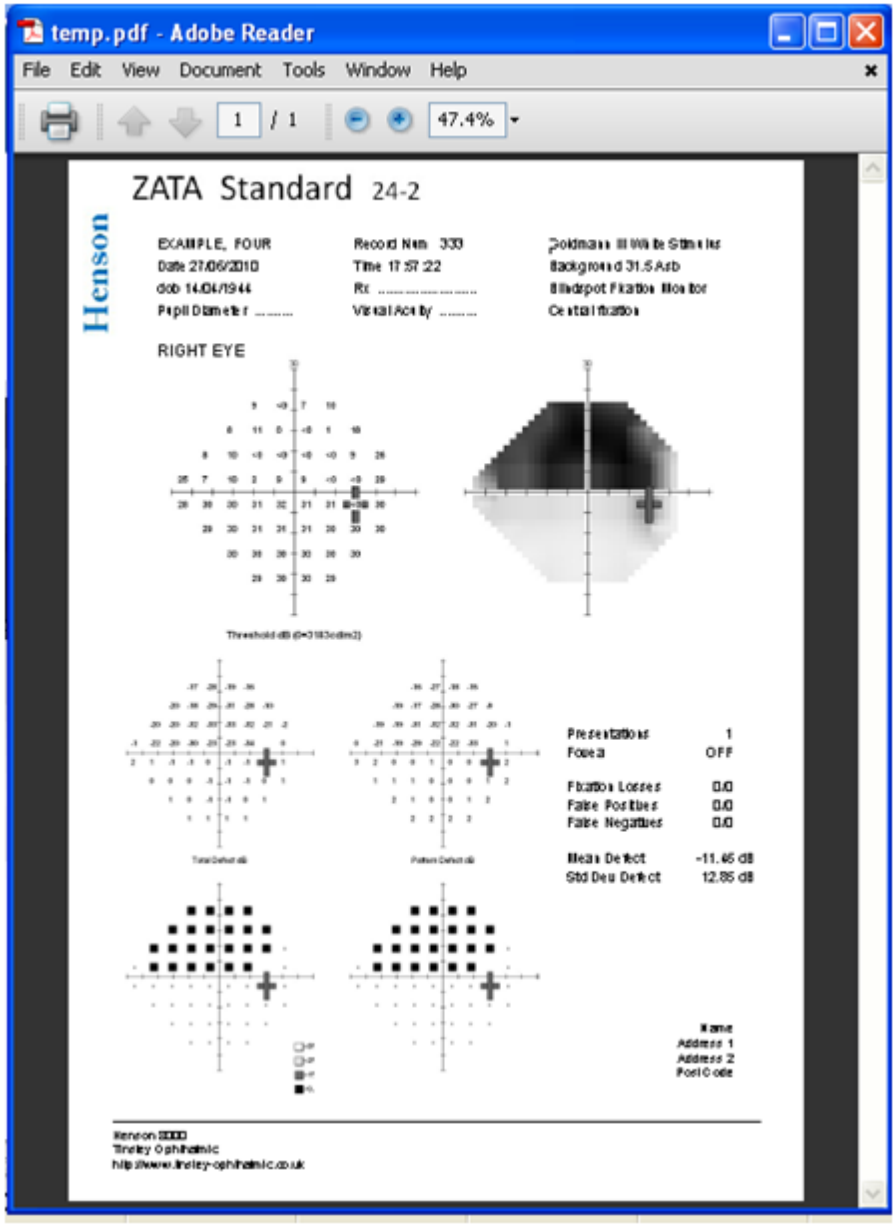

(Continued on next page)

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To print the results of a field test:

1. Click the **Print** button in the toolbar of the field test.

   The software creates an Adobe Reader file (*.pdf) of the results.

2. Click the **Print** button in the Adobe Reader toolbar.
3. In the resulting Windows *Print* dialog, enter any options (e.g. select a printer, and enter the number of copies) and click **OK**.

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4.1.3 Suprathreshold toolbar

Exit the program

Save[61] current visual field data (both eyes)

Print[63] results (both eyes)

Start new patient (same test)

Open the help file (context-sensitive)

Swap[54] eyes (without losing data)

Override[54] the current threshold method

Extend test to the next level[57]

Fixation targets[53]

Alignment target[42]

Action[58] when clicking over chart area of screen

Intensity[59] buttons

Indicates when patient presses Response[29] button (Single Stimulus tests)

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4.1.4 Suprathreshold Heart algorithm

This algorithm is used to set the test intensity when the By Measurement option is selected in a single stimulus supra-threshold test.

- The threshold sensitivity is measured at four test locations, one in each quadrant. The locations are displaced 9 degrees from the vertical and horizontal meridians.
- At each location the algorithm starts off 1dB brighter than the expected threshold for the patient's age. It uses a repetitive bracketing procedure with 1dB steps until six presentations have been made at all four locations.
- The average intensity of the last four presentations, at each of the four test locations, is then taken as the threshold. To guard against the inclusion of data from locations where the threshold is abnormally depressed, the algorithm excludes data from locations where the average of the last four presentations is below the 95% confidence limits of the expected age setting. If all test locations are excluded, the threshold is set at 4dB below the age setting.
- Ten demonstration[56] presentations are made prior to Heart data collection.

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Part V

5 Other Henson programs

The Henson comes supplied with the following utility programs:

- Database program 89
- Utilities program 100
- Options program 108

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5.1 Database program

The includes a powerful database program for the storage and recall of visual field data.

At the end of your visual field test you can save[61] your data in the database. You will be presented with a database entry form in which you will need to enter the patient's name, record number etc.

To access all the data stored within the database:

1. Click the **Database** button on the start-up screen.

2. Once open you can undertake a series of different actions[90].

Note: To save records and use the database you will need to have the free Adobe™ Reader installed.

This can be obtained from the website www.adobe.com

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5.1.1 Database operations

- Editing data in the Database 94
- Navigating the Database 93
- Finding a record in the Database 95
- Deleting a record from the Database 96
- Changing the active Database 91
- Backing up the Database 97
- Saving Database records as PDF 98
- Printing a Database record 99

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5.1.2 Changing the active Database

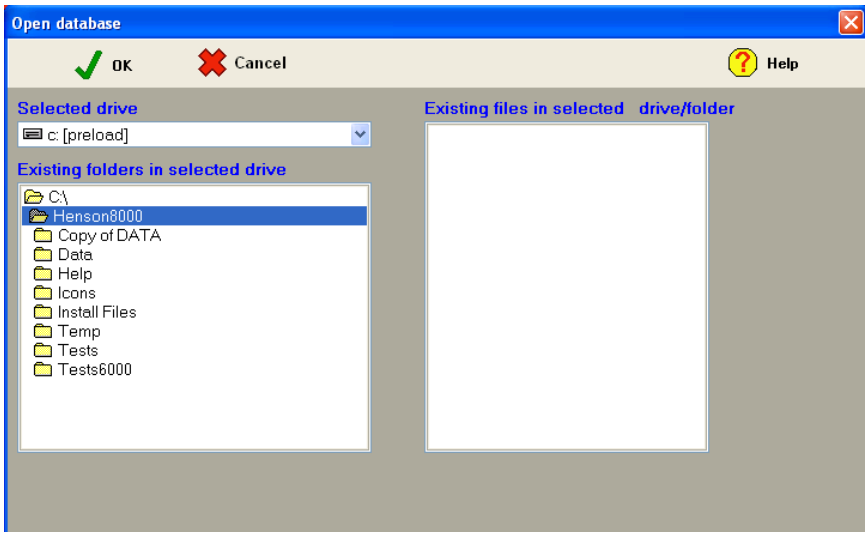
The can access and use many different database tables. Each one might contain data from a specific study, or a group of patients.

Use the method below to *view* data from a different database. (To *edit* records stored in a different database, you will need to change the default database using the Options[113] program.)

To view data stored in a different database:

1. Press **Open**.

2. Select an alternative database in the *Change Database* dialog.



3. Select the drive, double click the folder and finally click on to select the database name, before pressing OK

Note: When you next collect and save visual field data, the program will still use the database specified in the Options[108] program.

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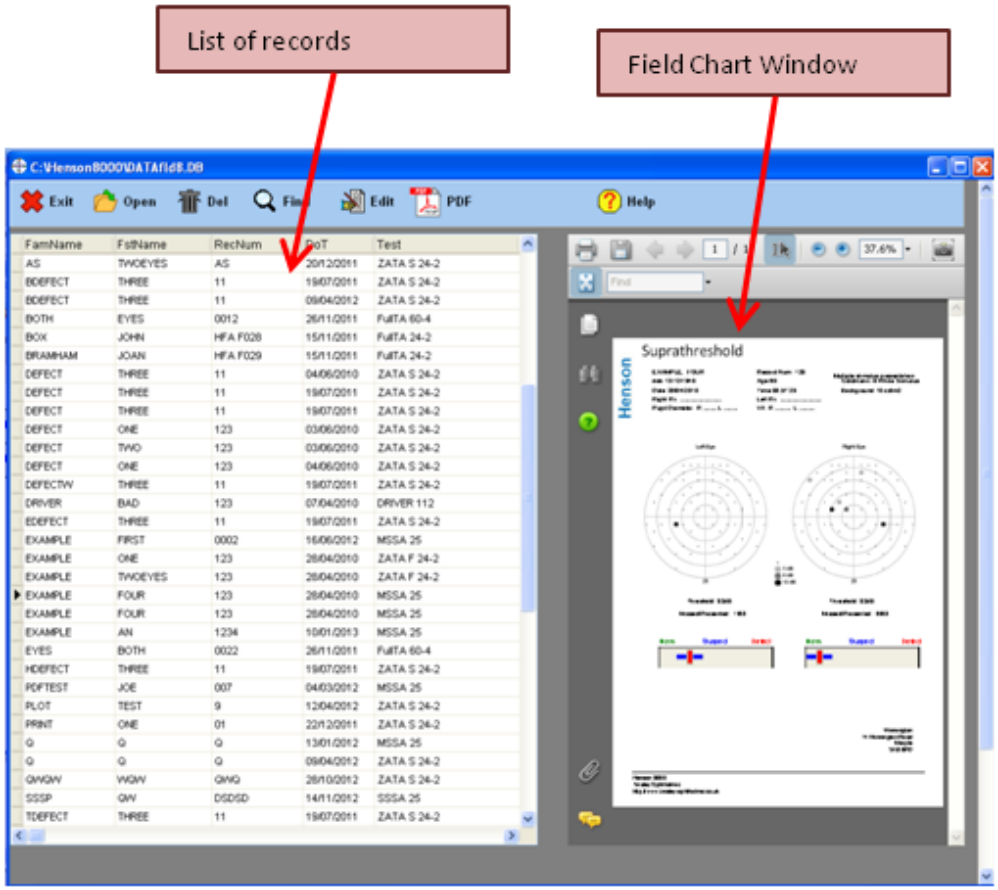
5.1.3 Database Field Chart

When you enter the Database program you will see a list of records on the left hand side of the screen and an image of the field chart on the right hand side. This chart refers to the currently selected record[95].



The Field Chart window contains a number of icons, e.g. to change the magnification of the image. Changes made using the icons within this window will not affect the information stored within the visual field database.

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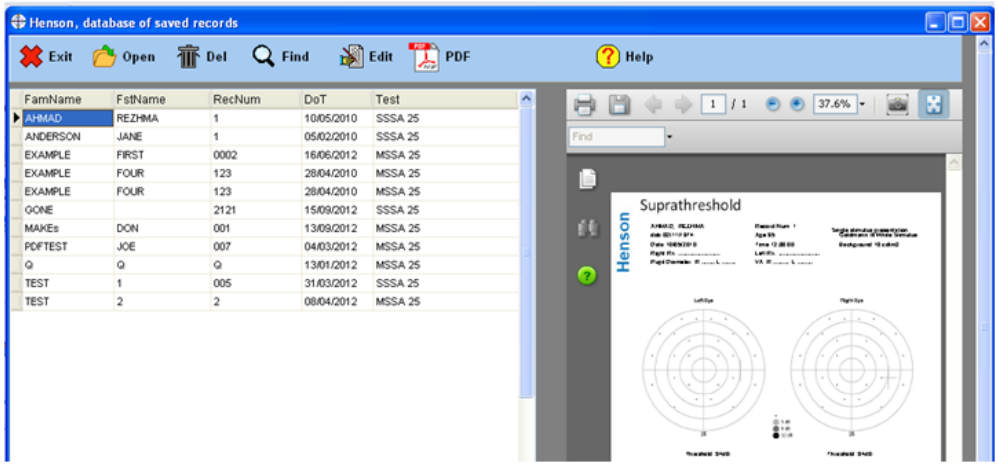
5.1.4 Navigating the Database

When you first enter the database you will be presented with a screen listing the current records, along with a field chart.



- Scroll through the records using the vertical slider, the arrow keys or Page Up/Down keys.
- Search for a specific record by clicking the **Find**[95] button.
- The order of records is initially sorted by family name (FamName). You can sort by record number (RecNum) or testdate (DoT) by clicking on the appropriate column header.
- The field chart on the right applies to the currently selected record (shown by an arrow in the left-hand column).

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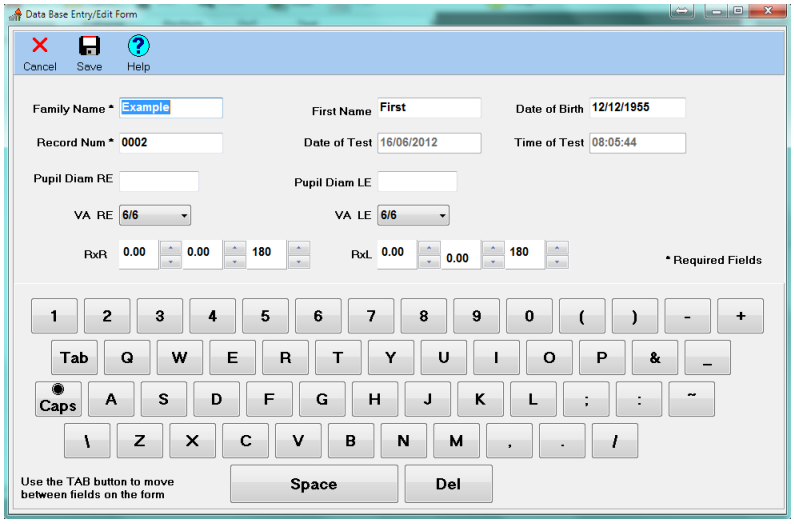
5.1.5 Editing data in the Database

Occasionally you may need to edit the data stored in the database. For example, a patient's name may have been misspelled, or a record may contain an error.

To edit a record:

Click the EDIT button.

The edit screen shown below will be displayed.



You can use either the on-screen keyboard or an external keyboard to edit the data in the fields.

Once you have made your changes click the SAVE button to save them.

Note: you cannot use the following characters (/ \ :) in patient name or record number (as these are used for the filename of the PDF of the printout and these characters cannot be used in filenames)

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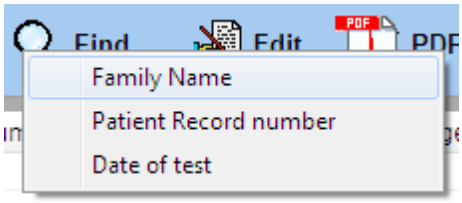
5.1.6 Finding a record in the Database

You can search for a record in the database using family name, record number or date of test.

1. Click the **Find** button.
2. Select *Family name*, *Patient record number* or *Date of test* from the drop-down menu.



3. Enter details of the record you are searching for.

Notes:

- The system searches for the nearest match. For example, if you search on Family name and press H, you will see the first record that begins with H. Enter more letters to narrow the search.
- Searching also sorts the database on the basis of the selected key. For example, if you are searching on Record number, the database will be sorted by record number (lowest number first).

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5.1.7 Deleting a record from the Database

To delete a record from a database:

1. Click the **Del** button.

2. When prompted, click **OK** to confirm.

Once deleted, a record cannot be retrieved.

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5.1.8 Backing up the Database

The Henson 7000 software stores visual field data in a database, the location of which is defined in the Options [113] file. The default location is:

C:\Henson9000\data\fld8.db

The Henson 7000 is also designed to keep a backup copy of the database on a pen drive in one of the computer's USB ports.

This backup will ensure that you do not lose your data in the unlikely event of a hard drive failure.

Every time you save a visual field record, both databases are updated.

Important:

You should make an additional copy of the database periodically and store it in a safe location, using the Utilities [100] program.

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5.1.9 Saving Database records as PDF

When you save a record, the raw data is stored in the database. A PDF file is created for printing and use by practice management systems.

1. Press the **PDF** button to create a new PDF file.

If you edit 94 a record, the PDF file will **not** be updated automatically. To update the PDF file, click the **PDF** button.

The **PDF** button can also be used to re-create the PDF file, should it become corrupt or accidentally deleted.

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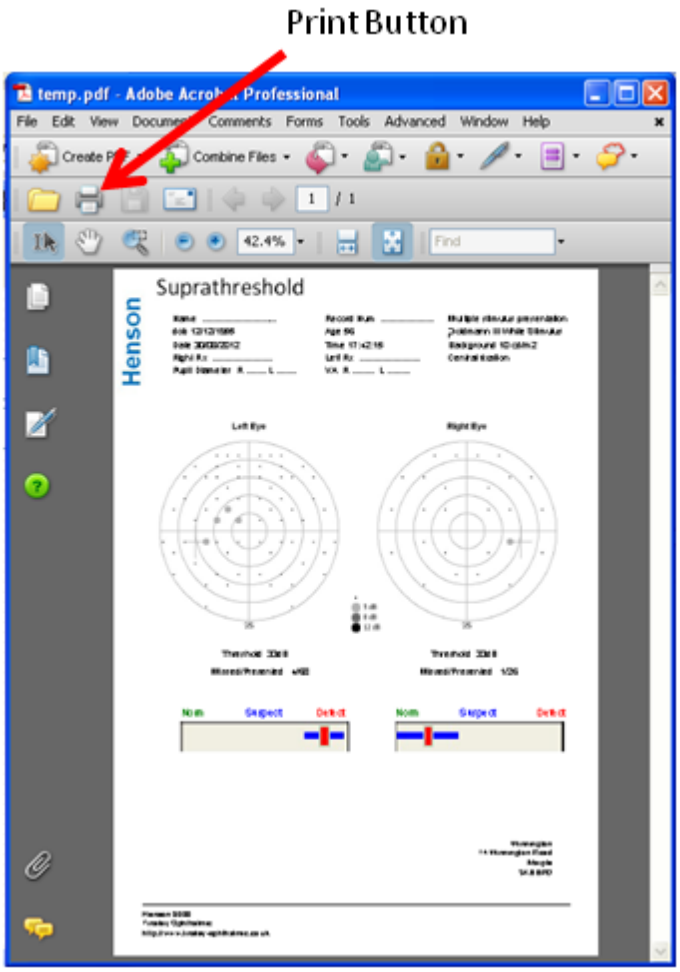
5.1.10 Printing a Database record

To print a record from the Database:

1. Press the **Print** button from within the PDF file.



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5.2 Utilities program

The Utilities program contains a number of routines to help with the management of your visual field database.

When you save a visual field record, it is stored in the database currently defined in the Options[108] program.

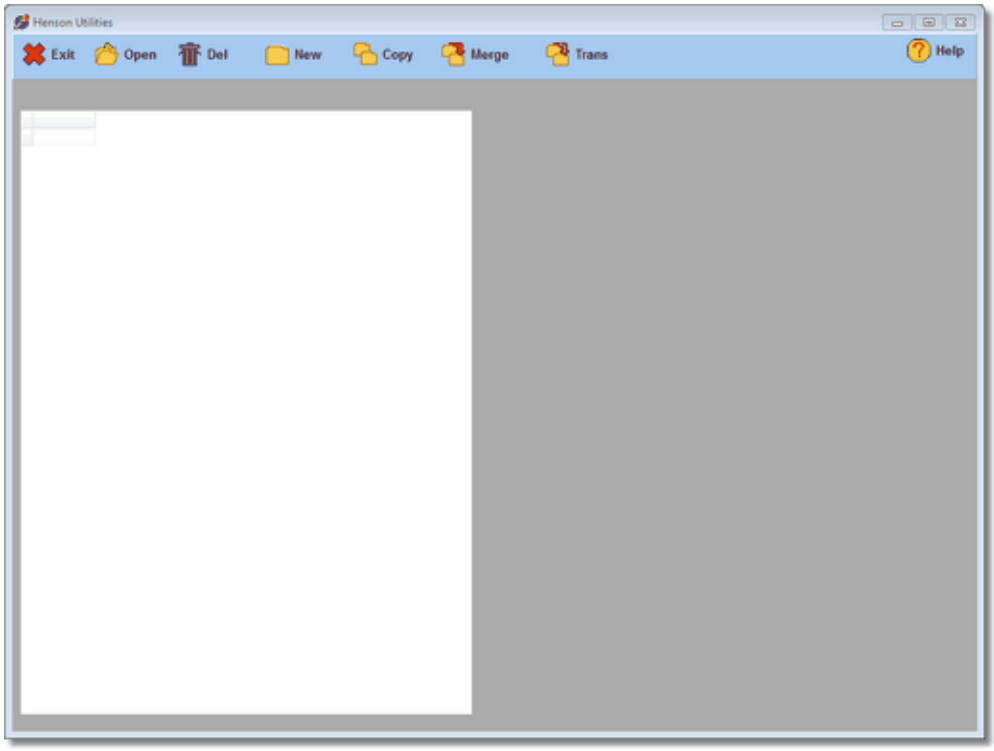
The default path name is:

C:\Henson9000\data\fld8.db

To load the Utilities program:

1. On the start-up screen, press **Utils**.

The Utilities program displays a list of the records in the database currently specified in the Options[113] file.



- You can edit the data within a record by selecting the relevant cell and correcting the information.
- If you change the data so that the Family Name, Record Number and Test Date match that of another record in the database, you will get an error message.
- You can delete a record by selecting one of the cells in the record and clicking

.

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See:

- Opening an existing visual field database 102
- Creating a new visual field database 103
- Copying a visual field database 104
- Merging databases 105
- Transferring records between databases 106

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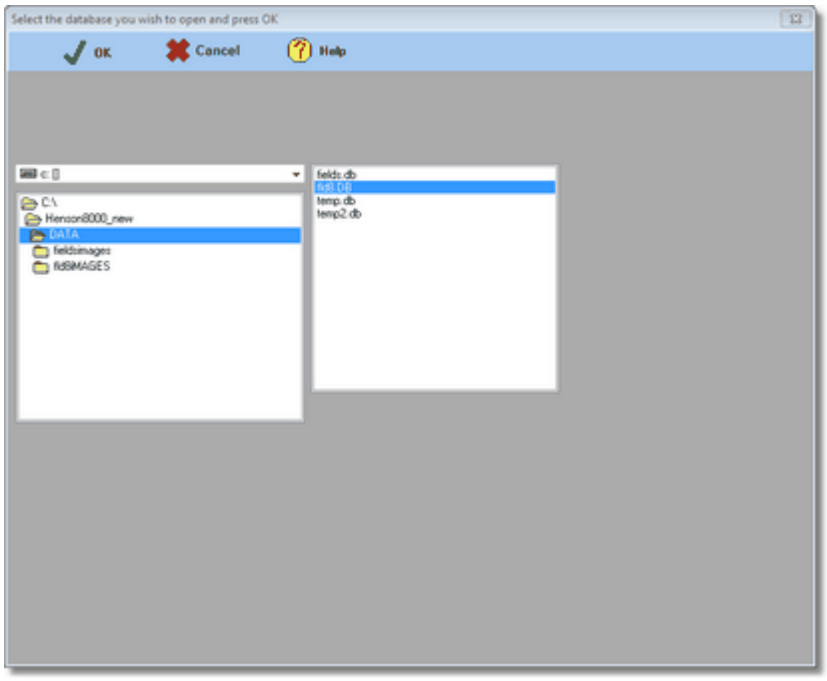
5.2.1 Opening an existing visual field database

The OPEN routine allows you to load and inspect data stored within other Henson databases.

To open a different Henson database:

1. Load the Utils program[100] from the start-up screen.
2. Press

on the Utilities toolbar.
3. Select the drive from the drop-down menu.
4. In the left-hand panel, navigate to and open the directory containing the database you want to open.
5. In the right-hand panel, select the database you want to open.
6. The list of files shown is filtered to only show those of the correct type (i.e. those ending with .db).
7. Click OK.



Once a database is loaded you will be able to perform all the other utility routines, e.g. copy, merge edit.

When you exit the Utiliies program the Henson software will revert back to the database defined within your Options[113] file.

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5.2.2 Creating a new visual field database

The NEW routine allows you to open up a new database that can be used to store visual field data. Once it has been created you can set it to be your default database within the Options program or you could transfer visual fields from other Henson visual field databases to create a subset of records that might be used in a study or report.

To create a new Henson database:

1. Load the Utils program[100] from the start-up screen.
2. Press

on the Utilities toolbar.
3. Select the drive from the drop-down menu.
4. Navigate to and open the directory where you want to create the database.
5. In the text box at the top of the screen, enter the file name for your new database (it must end with .db).
6. Press **OK**.

Notes

- You can use the on-screen or external keyboard to enter the file name.
- The file name must end in .db (if this is omitted then the software will add it when the OK button is pressed)
- When the database is created, a folder will be created to hold the PDF images of the printouts.
- When you exit the Utilities program the Henson software will still be using the default database defined within your Options[113] file. To use the new database as the default for saving records, open the Options program and set it on the database tab.

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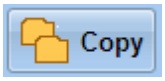
5.2.3 Copying a visual field database

When you save a visual field record, it is stored in the database currently defined in the Options[108] program.

The perimeter software also saves a backup copy of the data on a pen drive fitted inside the perimeter (Database Backup[97])

For added security you should occasionally backup the database to a removable drive, where it can be stored off site.

To make a third copy of the database:

1. Connect a removable drive to one of the USB ports.
2. Load the Utils program[100] from the start-up screen.
3. Press 

on the Utilities toolbar.
4. Select the drive from the drop-down menu.
5. Navigate to and open the directory where you want to save the database copy.
6. Press **OK**.
7. When the copy has been completed, remove the destination drive and store it in a safe place away from the perimeter.

Notes

- The database name will remain the same as the original.
- This function copies all the database files along with the sub-directory '***images' which contains the PDF image files.

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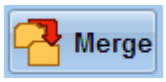
5.2.4 Merging databases

You can merge the data contained in two databases. This is normally done when you have more than one Henson perimeter and you want to add the data you have collected on one instrument to that collected on the other.

To merge two databases:

1. Load the Utils program[100] from the start-up screen.
2. Copy the data you want to merge onto a USB pen drive.
3. Insert the USB pen drive with the copied data on into one of the perimeter's USB ports.
4. Press the 

button.
5. Select the USB pen drive letter (e.g. **e:**) from the drop-down menu.
6. In the left-hand panel, open the directory on the pen drive containing the data you want to merge.
7. In the right-hand panel, select the database file (*.db) that you want to merge.
8. Press **OK**.

Depending on the size of the database this operation may take a few moments.

The merge function copies all the database files, along with files in the sub-directory '**images' (which contains the PDF image files).

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5.2.5 Transferring records between databases

The Transfer routine allows you to copy individual records from one Henson visual field database to another. You may want to do this in order to keep a separate database of patients who are in a particular study.

In the instructions below:

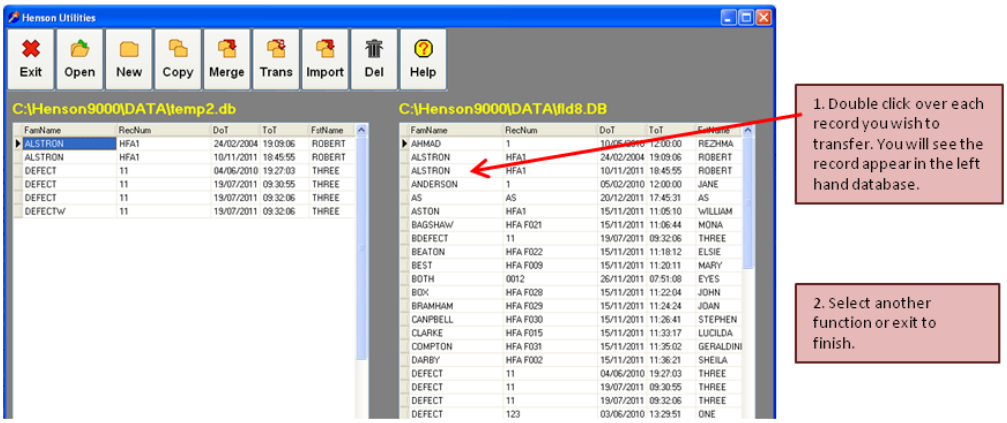
- The *Source* database contains the records you want to transfer
- The *Target* is the database into which you are transferring records

To transfer records:

1. Load the Utils program[100] from the start-up screen.
2. Open[102] the *Target* database.
3. Press

on the Utilities toolbar.
4. Select the *Source* drive from the drop-down menu.
5. In the left-hand panel, navigate to and open the *Source* directory.
6. In the right-hand panel, select the *Source* database.
7. Press **OK**.
8. Both sets of database records are listed in the Utilities window.
9. In the right-hand panel, double-click each record you want to transfer.
10. Select another function on the toolbar, or press

.



.

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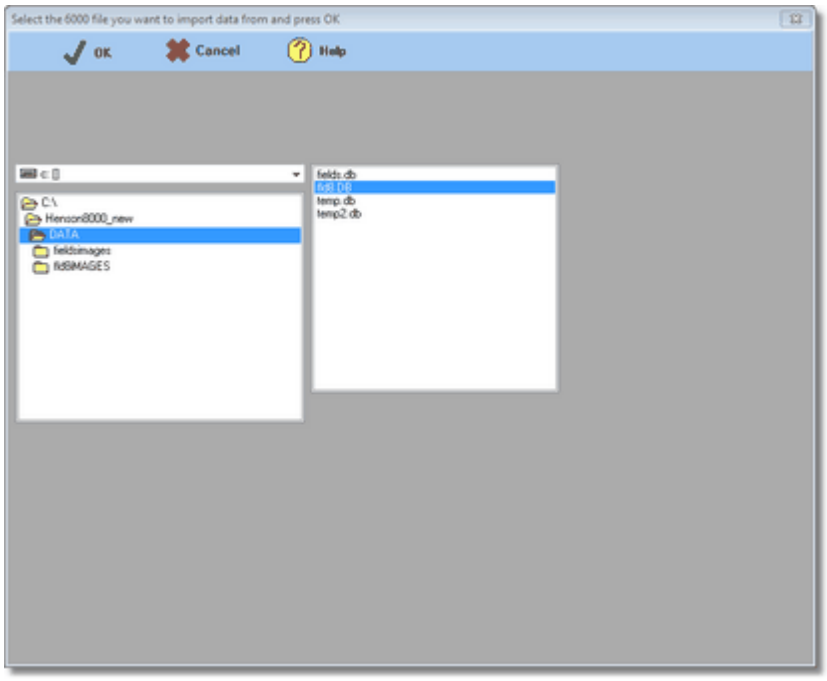
5.2.6 Importing data from a Henson 5/6000 Database

The IMPORT routine allows you to import data stored within an earlier Henson 5/6000 database.

To import data from a Henson 5/6000 database:

1. Load the Utils program[100] from the start-up screen.
2. Press

on the Utilities toolbar.
3. Select the drive from the drop-down menu.
4. In the left-hand panel, navigate to and open the directory containing the database you want to open.
5. In the right-hand panel, select the database you want to open.
6. The list of files shown is filtered to only show those of the correct type (i.e. those ending with .db).
7. Click OK.



Once a database is loaded you will be able to perform all the other utility routines, e.g. copy, merge edit.

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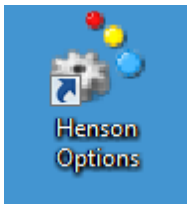
5.3 Options program

The Options program allows you to set certain parameters of the visual field test and the associated programs.

To use the Options program:

1. Exit from the normal perimeter programs.
2. Run the Options program from the Windows desktop.



3. Once you have made the required changes press the Save button; the changes on all the pages will be saved.

The Options program presents a series of tabs along the top of the screen:

- Address[109] : Enter the practice name and address
- Supra Tests[110] : Set up some supra-threshold test defaults
- Computer[112]: Information on the perimeter's USB device
- Database[113] : Full path name of default (active) database
- Backup[114] : Full path name to a removable backup drive

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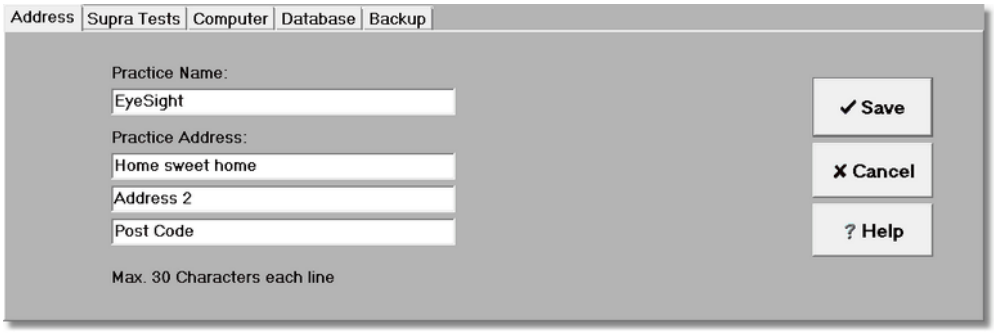
5.3.1 Address

- The Practice name and address appear at the bottom of any printouts.
- Use the on-screen keyboard or an external keyboard to make changes.
- Press Save to save the changes.

Note: Pressing **Save** will save all the changes you have made in this session (not just those on the current tab).



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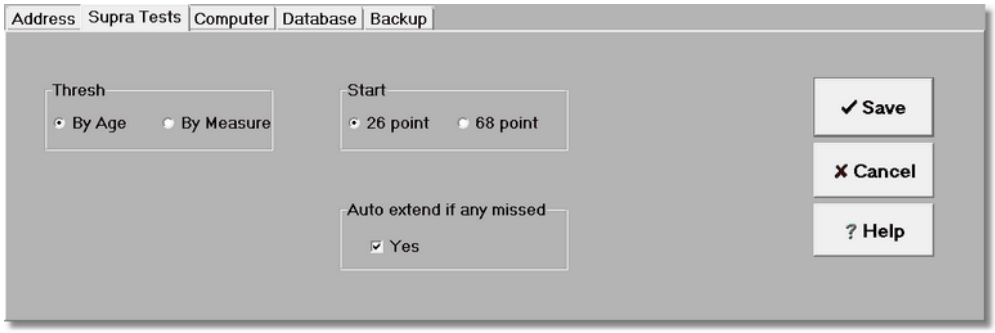
5.3.2 Supra Tests



Supra-Threshold tests

- Whether the threshold is set by age or by measurement (you can override[54] this at the onset of a test)
- Whether the program starts off at level 1 (26 points) or 2 (68 points)
- Whether the program auto extends after level 1

ZATA Threshold test

No options currently available.

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5.3.3 Drivers Tests

Min volume On

You must set this option On for the test to be valid in the UK.

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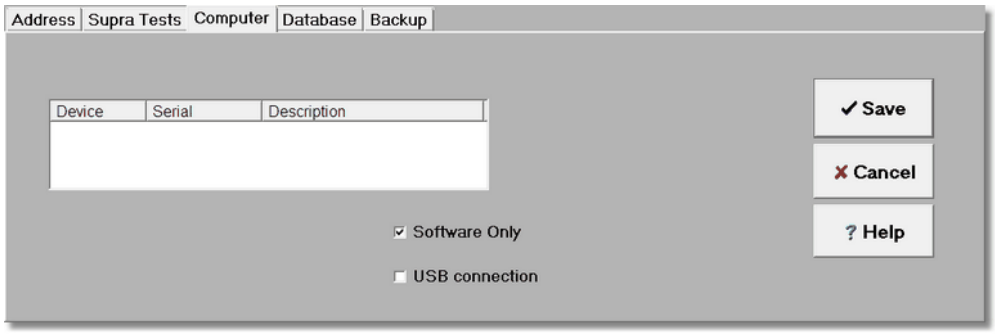
5.3.4 Computer

This is where you select the perimeter's USB device. A list of devices will appear in the box. Normally there will only be one device. However, there may be others if your computer has additional devices attached.

1. Click on the perimeter's USB device.
2. Press **Save** to store the device details.
3. Ensure the USB Connection tick box is ticked.

Software Only: When this is ticked, the perimeter programs can be run without the perimeter being connected. This facility is available for those who wish to access the database away from the perimeter, and to allow training and demonstration of the software.



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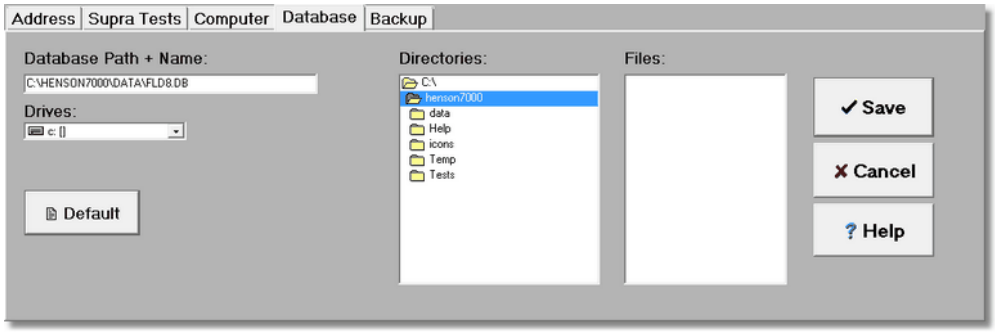
5.3.5 Database

This tab specifies the name and path of the default database[89]. This is where:

- Visual field records will be stored when you press the Save[61] button after a visual field examination
- Records for the selection of prior data will be first accessed when opting to start from exisiting data in the threshold programs
- Records will first be accessed when you open the database program from the start-up screen.

To set the Backup path name:

1. Select the Drive letter. This will normally be the internal C: drive of the computer, but could be any other drive to which the computer has access, e.g. a file server.
2. The directories available on the selected drive will be displayed in the Directories list box. Select the one you wish to use. This will normally be the one called 'Data'.
3. The files within that directory will be listed in the Files list box. Select the one you wish to use.
4. The selected path and file name will be displayed in the 'Database Path + Name' field.
5. If necessary, press **Default** to reset the default path and file name (**C:\Henson7000\data\fld8.dbC:\Henson9000\data\fld8.db)**
6. Press **Save** to store your new path and name.



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5.3.6 Backup

This tab specifies the perimeter's backup path. This is where your database files are backed up. Normally this will be a removable USB flash drive that can be moved to a safe location overnight. If your Henson is networked, then the backup location can be a mapped drive on another computer / server.

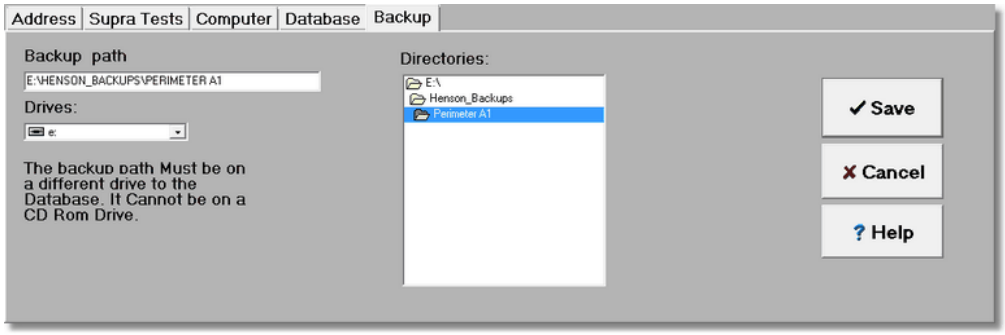
The backup folder must be on a different drive to the default database 113.

For example:

E:\Henson_backups

Only the location is specified, the database name will be the same as the current database.

The database is automatically backed up to the external folder every time you save a visual field record. You can make a copy of the database using the Utilities 100 program.



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5.3.7 Video Setup

Setting up the video image

To optimise the video image:

1. Select the video device from the drop-down menu.
2. Use the **Plus**/**Minus** buttons to adjust the image zoom factor.
3. Use the **up/down/left/right** buttons to position the image in the video window.
4. Adjust the **Brightness** and **Contrast** sliders to optimise the video image display.
5. Press **Save**.

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Part

6 Appendix 1 - 9000 Technical Specification_2

- 1. TYPE
  Computerised perimeter capable of measuring the visual field out to an eccentricity of 72 degrees. (with re-location of central fixation)
  Chart distance: 25 cm.
  Background luminance: 3.15cd/ m2 and 10cd/ m2 (dependant on test)
- 2. STIMULI
  LEDs with broad spectral output ranging from 540-590nm (3dB down). Angular subtence: 0.5 degrees (Goldmann III). Luminance: 0.016 - 1000 cd/ m_ (0.05 - 3150 asb). Presentation time: 200ms.
- 3. FIXATION MONITOR
  Heijl-Krakau technique in full threshold programmes. on-screen image of eye presented via CCD camera below central fixation LED in bowl.
- 4. FIXATION TARGETS
  Red LED or cross pattern of red LED's with broad spectral output of 625 - 675 nm.
- 5. COMPUTER
  The unit can be controlled from any PC running a compatible operating system.
- 6. INPUTS / OUTPUTS
  -USB 1.1 compatible Port
  -Mains Inlet Connector (IEC 320)
- 7. DIMENSIONS
  449x 400 x 300 mm (L x D x H)
- 8. WEIGHT
  ?? kg
- 9. ELECTRICAL SPECIFICATION
  Mains Input Voltage: 100-240 VAC ; universal input.
  Fuses: 2 off 20 x 5mm IEC 60127-2 High breaking capacity.
  Fuse rating: 240Vac T1.6AH250V
  110Vac T2AH250V
  Frequency 50/ 60 Hz
  Power consumption: 75 VA
  Input Connector filtered IEC 320 socket.
- 10. CLASSIFICATION
  Mains operated
  Class 1
  Type B Applied Part
  Continuous operation
  Equipment not suitable for use in presence of flammable anaesthetic mixtures with air or oxygen or nitrous oxide.
  Ordinary equipment without protection against ingress of water
- 11. ENVIRONMENT
  Temperature:
  Operating . . . . . 5° to 35°C (41° to 95°F)
  Storage. . . . . -20° to 50°C (-4° to 122°F)
  Relative humidity. . . . . 10% to 90% (non condensing)
  Maximum vibration:
  Operating . . . . . 0.9 GRMS using a random-vibration spectrum that simulates shipment by air
  Storage. . . . . 1.3 GRMS using a random-vibration spectrum that simulates shipment by truck
  Maximum shock:
  Operating . . . . . 1.52 m/ sec (60 inches/ sec) (less than or equal to a pulse width of 2 ms)
  Storage. . . . . 2.03 m/ sec (80 inches/ sec) (less than or equal to a pulse width of 2 ms)
  Altitude:
  Operating . . . . . 0 to 3048 m (0 to 10,000 ft)
  Storage. . . . . 0 to 12,192 m (0 to 40,000 ft)
- 12. ACCESSORIES AND DETACHABLE PARTS
  The Henson is supplied with the following accessories and detachable parts:
  Set of spares in case consisting of fuses and bulbs
  Patient response button and cable assembly
  Mains lead for Henson
  Back up of installed software. (This may be held on the internal Hard disk)
  Occluder (eye patch)
  Dust Cover

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(This) Operating Manual

- 13. OPTIONAL EXTRAS
  Electric Table
  InkJet Printer
- 14. LIST OF SPARE PARTS
  Mains Fuses: 240V : T1.6AH250V
  110V : T2AH250V
  Occluder
  Patient Response button
  Dust Cover

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Part

7 Appendix 2 - 9000 Connection Details

The picture below shows the rear panel of the Henson 9000

All of the connections can be seen.

The fuses are located in a drawer under the mains power plug Outlined in Yellow on the picture.

The USB B type connectors is outlined in Green.

The patient response button is plugged into the jack socket on the top left or the rear panel.

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Part

8 Appendix 3 - Installation

1. Location

The electrical installation of the room where the Henson visual field screener is to be operated must comply with the "Regulation for the electrical equipment of buildings" published by the Institution of Electrical Engineers. The unit must be protected from ingress of liquids and flammable anaesthetic mixtures.

2. MAINS SUPPLY

The mains supply required is 250 VA (maximum, depending on instrument) 110-240Vac.
An IEC approved mains lead must be used with conductors of at least 0.75mm2 cross sectional area.

3. INTERCONNECTING

Connect the supplied mains lead from the mains input connector on the instrument to the mains supply . (Either direct from the wall socket or via the electric table).
Plug the patient response button jack plug into the socket on the rear panel of the unit.

4. ACCESSORIES

If the unit is located on an electric table, the table should be connected to the mains supply using the supplied lead and the Henson should be powered from the power outlet at the top of the table.

5. SAFETY

Ensure the connected leads do not trail on the floor and are not subject to abrasion on sharp edges. Use only printers, computers and monitors that conform to EN60950.

6. EMC

The Henson range of visual field screeners conform to European Directive 89/336/EMC but they do emit radiation and if it causes interference with other items of equipment, position it further away or try a different orientation. Do not operate transmitters or mobile telephones in close proximity to the equipment.

7. AMBIENT TEMPERATURE AND HUMIDITY

For use the equipment should only be operated if the ambient temperature is between 10 and 40 degrees Celsius and the humidity is between 30% and 75% non condensing and pressure between 700 and 1060 m bar.
For storage and transport the ambient temperature must be between 0 and 60 degrees Celsius, the humidity between 10% and 80% non-condensing and pressure between 500 and 1060 mbar.

INSTRUCTIONS

The Henson Visual field screener must be used in accordance with the operating instructions. Please read the instructions before attempting operation.

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Part

9 Appendix 4 - Networking

Your Henson can be networked if for example you have multiple machines and want to access the same database or if you have a network printer or if you want your database to reside on a server for backup purposes.

Your options for networking the Henson will depend on the computer equipment that it is attached to. Most Computers will have a network connector and many laptops will also include a wireless adaptor. Refer to your computer's manual for details of networking options for your computer.

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Part

10 Appendix 5 - Troubleshooting

there are several error messages that you may see when operating your Henson.

Some of these are listed below

- Background out of Tolerance[129]
- Bowl Error[130]
- LED error[131]
- Key violation[132]

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10.1 Background out of Tolerance

The Henson 7000 incorporates special sensors within the bowl which continually maintain the background luminance at the correct level.

- If this intensity cannot be maintained at the beginning of an examination, an error occurs.
- The most likely cause for this error is the room illumination being too bright. If this is the case, turn down the room illumination and press the **Restart** button.
- The error may also be caused by a failure of one of the bowl illuminators.
- If you press **Continue** the Henson 7000 will proceed with the test. Data collected will not, however, be valid.
- If problem continues, contact a service engineer.

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10.2 Bowl Error

This error occurs when the bowl does not appear to be working.

If problem continues, contact a service engineer.

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10.3 LED error

At the beginning of each examination, LED operation is checked automatically. If a fault is detected, an error message will be displayed.

- You can press **Continue** to proceed with the test, but note that data collected may be subject to error.
- If problem continues, contact a service engineer.

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10.4 Key violation

A key violation can occur when you try to save a record in the database using the same family name, record number and date of test of a record that already exists.

This usually occurs if you have already saved a test for this patient on the same day.

the solution to this is to append something onto the record number. i.e. record number that exists is 12345 make the new one 12345A then when displayed in the database the 2 records will be adjacent.

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Part

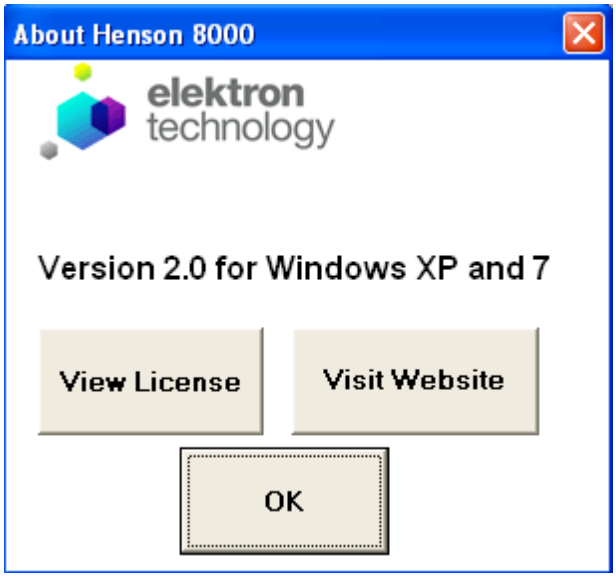
11 Appendix 7 - License file

The startup screen of the Henson software includes an About button.

Selecting this button open up a window that tells you the version number of your current software, see below.

In addition it gives you a link to the web site of Elektron- the manufacturers of the Henson range of perimeters and a second link to a file that gives details of your License.

To close this window select the OK button.



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